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WETLAND PROTECTION
IN
SUPERFUND REMEDIATIONS

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This report is part of the National Network for Environmental Management Studies (NNEMS) under the auspices of the Office of Cooperative Environmental Management of the U. S. Environmental Protection Agency. Wetland protection at Superfund remedial sites is an increasingly important concern, particularly on the East Coast of the United States where wetlands are frequently associated with Superfund sites. The Superfund program is aware of the shift within the EPA to include consideration of environmental impacts in risk assessments. In the future, the Superfund program will more fully consider impacts to the environment at Superfund sites. This is a new direction for the Superfund Program.

This study scrutinizes the existing legal complexities of the issue, the interactions of all major agencies involved, the role of Bioassessment Work Groups, and the subtleties of mitigation. Also, the study reviews the opinions of personnel from the Environmental Protection Agency, Department of Interior, Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration. The study includes recommendations concerning wetland assessment, mitigation, trustee responsibilities and policy making.

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EXECUTIVE SUMMARY

Wetland protection at Superfund remedial sites is becoming an increasingly important concern, particularily on the East Coast of the United States where wetlands are frequently associated with Superfund sites. The results of the National Poll that is a part of this study conclude that in the four Regions of EPA that encompass the East Coast, approximately 74% of Superfund Remedial sites have wetlands associated with them, either directly or indirectly. Regions V, VI, and X also have high Superfund-wetland interface.

The Environmental Protection Agency as a whole has been expanding its traditional focus on issues of human health protection to include a more stringent consideration of the environment. The Superfund program is becoming aware of this shift and is becoming involved in the process of more fully considering impacts to the environment on Superfund sites. This is a difficult shift for Superfund. The primary concern is and always will be, of necessity, public health. This fact coupled with the vastly differing statutory missions of other agencies and the inherent constraints and complexity of the Superfund process itself combine to make the issue of wetland protection a challenging one. EPA has experienced a high turnover rate among Regional Project Managers; the turnover rate has made it difficult for EPA to retain its "institutional memory." The entire process of wetland assessment, mitigation and trustee responsibilities is continually rehashed with RPMs and attorneys.

This study scrutinizes the existing legal complexities of the issue, the interactions of all major agencies involved, the role of Bioassessment Work Groups, subtleties of mitigation and the the opinions of personnel from the Environmental Protection Agency, Department of Interior, Fish and Wildlife Service,

and the National Oceanic and Atmospheric Administration. Recommendations include the following:

1) A single Policy Statement that definitively outlines existing legal requirements and concerns for the protection of wetlands and the environment on Superfund sites. This policy should be reflected in Guidances for Regional Project Managers.
2) The goals of mitigation in all of its forms need to be identified.
3) Available scientific information needs to be utilized to aid in the evaluation of the effectiveness of mitigation practices. New studies need to be initiated and coordinated with existing work in this field to fill data gaps.
4) Uniform interpretation of existing Laws, and ARARs must be realized and applied.
5) Increased cooperation, communication and coordination between State and Federal agencies and within the Environmental Protection Agency is essential to the protection of wetlands. Mechanisms for these activities should be reflected in Policies and Guidance.
6) Bioassessment Work Groups should be mandatory in all Regions and have one or two individuals staffed full-time to coordinate activities for the group.

LIST OF ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
BA	Biological Assessment
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CRC	Coastal Resources Coordinator
CWA	Clean Water Act
CZMA	Coastal Zone Management Act of 1972
DEIS	Draft Environmental Impact Statement
DOC	Department of Commerce
DOI	Department of Interior
EA	Environmental Assessment
EEZ	Exclusive Economic Zone
EIB	Environmental Impact Branch
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ERRD	Emergency and Remedial Response Division
FWCA	Fish and Wildlife Coordination Act of 1958
FWS	Fish and Wildlife Service
HAZMAT	Hazardous Materials
HRS	Hazard Ranking System
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
NPS	National Park Service
NRDA	Natural Resource Damage Assessment
NWI	National Wetlands Inventory
OEA	Office of External Affairs
OEPR	Office of Environmental Project Review
OFA	Office of Federal Activities
OPM	Office of Policy and Management
OSWER	Office of Solid Waste and Emergency Response
OWP	Office of Wetland Protection
PA	Preliminary Assessment
PNRS	Preliminary Natural Resource Survey
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act of 1986
USDA	U.S. Department of Agriculture

FOREWORD

The purpose of this study is to: 1) Outline the existing legal requirements surrounding the protection of wetland ecosystems at Superfund remedial sites; 2) Portray the role of the Natural Resources Trustees and Bioassessment Work Groups as primary implementors of wetland protection; 3) Identify constraints in the area of Superfund-wetland protection as voiced by major agencies with jurisdiction in this area; 4) Develop an awareness of where Superfund personnel stand on this issue via a national survey of regional practices; and 5) Foster an understanding and appreciation for this relatively new and escalating area of concern through the provision of pertinent information and recommendations for further study.

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I. INTRODUCTION

Wetland protection issues at Superfund Remedial sites are surfacing across the country. As the Environmental Protection Agency expands its traditional focus on issues of human health protection to include a more stringent consideration of risks to the environment, wetlands are becoming the object of increasing attention. The creation of the Office of Wetlands Protection (OWP) in 1986 and subsequently the position of Superfund liason within the OWP is evidence that wetland ecoystems are rapidly becoming a more salient variable in the Superfund process.

The frequency of occurrence of wetlands associated, either directly or indirectly, with Superfund sites, is high (see results of National Poll,sec.8). Historically, wetlands have been regarded as valueless land, and hence have become receptors for garbage dumps, sanitary landfills and chemical wastes. The topographically depressed nature of wetlands and frequent occurrence of a naturally impervious layer such as a clay deposit, in addition to the fact that wetlands are not suitable sites for construction, have in the past made wetlands a "good choice" for such activities.

The Superfund Program is necessarily action oriented. The primary mandate, to provide protection of the public health, is essential and recognized by all, as such. However, an increasing awareness of the Superfund remedial process by agencies with jurisdiction over natural resources on Superfund sites coupled with continually growing knowledge of the functions and values of wetlands have combined to produce a forum for the protection of wetland ecosystems.

Environmental protection issues at Superfund sites are becoming focused components of the Superfund process, introducing a fair degree of complexity and confusion. The following sections will attempt to identify and mitigate the confusion.

WHY PROTECT WETLANDS?

* UNIQUE FUNCTIONS, VALUES:

-PRODUCTION EXPORT	-SEDIMENT/TOXICANT RETENTION
-WILDLIFE DIVERSITY	-SEDIMENT STABILIZATION
-AQUATIC LIFE DIVERSITY	-FLOOD FLOW ALTERATION
-RECREATION/AESTHETICS	-GROUNDWATER DISCHARGE
-NUTRIENT REMOVAL/TRANSFORMATION	-GROUNDWATER RECHARGE
-ENDANGERED SPECIES HABITAT	-ECOLOGICAL FOOD CHAIN SUPPORT

* HEIGHTENED AGENCY AWARENESS AS EVIDENCED BY DEVELOPMENT OF OFFICE OF WETLANDS PROTECTION IN 1986

* EXISTING ARARS: LAWS, EXECUTIVE ORDERS, POLICY STATEMENTS

II. SYNOPSIS OF SUPERFUND REMEDIAL PROCESS

Optimally, it is in the scoping phase of the Remedial Investigation/Feasibility Study that wetlands are identified and integrated into the planning process. Frequently though, impacted wetlands are not identified on Superfund sites until much later. This complicates the process. After identification of a wetland, it must be delineated and assessed to determine impacts and extent of damage. Finally, mitigative alternatives are discussed and one is chosen. Wetlands identified late in the process can: 1) potentially slow the process if properly protected under existing ARARs or 2) add to the group of wetlands damaged without compensation.

This section is intended to give a brief outline of the Superfund Remedial Process and to document all portions of the EPA Guidances on Remedial Investigations and Feasibility Studies that either directly or indirectly have a bearing on wetland ecosystems. It is valuable to understand the perspective of the Regional Project Manager and the Agency through "in-house" primary resources.

Figure 1 depicts the structure of the Superfund Remedial Process.

Hazardous waste sites are either discovered, or notification is given of their existence. As soon as a potential site is identified, a Preliminary Assessment (PA) is done. A PA is a quick, low cost review of available information, undertaken to determine if the site merits further action, no action or emergency response. A PA includes site visits, but no sample collection.

Site Inspection (SI) The SI defines and characterizes the problem at the site and determines the need for further action. The SI always involves a site visit and sample collection.

Hazard Ranking System (HRS) The HRS is designed to evaluate facilities on the basis of potential risks to public

Figure 1

SUPERFUND REMEDIAL PROCESS

Site Discovery or Notification

PHASE 1 Pre-Remedial Investigation	Preliminary Assessment (PA) Site Inspection (SI) Hazard Ranking System (HRS) Listing on National Priority List (NPL)
PHASE 2 Evaluation of Remedial Alternatives	Scoping of Remedial Investigation/ Feasibility Study Remedial Investigation (RI) Feasibility Study (FS) Record of Decision (ROD)
PHASE 3 Implementing Remedial Action	Remedial Design (RD) Remedial Action (RA) Operation & Maintence (O&M) Post Closure Monitoring Cost Recovery (CR)

Who is involved in the remedial process?

EPA	Responsible Parties
Other Federal Agencies	Contractors
States	Citizens

health and the environment caused by the release of hazardous substances relative to other facilities. A HRS score of 28.50 is the cut off for including sites on the National Priority List. Note: CERCLA/SARA Sec 125 provides:

(a) Revision of the Hazard Ranking System. The President shall revise the HRS in effect under the National Contingency Plan with respect to such facilities in a manner which assures appropiate consideration of each of the following site-specific characteristics of such facilities:

(1) The quality, toxicity and concentrations of hazardous constituents which are present in such waste and a comparison thereof with other wastes.

(2) The extent of, and potential for, release of such hazardous consituents into the environment.

(3) The degree of risk to human health and the environment posed by such constituents.

The National Priority List(NPL) lists the Nation's highest priority sites for remedial action and is updated annually. The Remedial Investigation (RI) emphasizes data collection and site characterization. It is conducted concurrently with the Feasibility Study (FS) and is the data collection mechanism for the FS effort.

Remedial Investigation Guidance

Several sections of the Guidance on Remedial Investigations under CERCLA (EPA/540/G-85/002 June 1985) request the collection of pertinent environmental data or are in other ways peripheral to the wetlands issue. The following sections are taken from this Guidance.

2.2.1.3 Receptors

Data on human and environmental receptors in the area surrounding the site should be compiled in this section. Any

threatened, endangered or rare species in the area as well as sensitive environmental areas should be identified.

6.7.2 Department of Interior

DOI may provide assistance in performing remedial investigations through its various services and offices. The Fish & Wildlife Service may be consulted for information on endangered species, critical habitats, and wetlands in the vicinity of the site. Under EPA/DOI Memo of Understanding (September 2, 1983), the Office of Environmental Project Review is responsible for performing preliminary surveys of damages to natural resources when notified of the need for such a survey by EPA's Office of Waste Program Enforcement.

7.2.2 Data to be Collected

(a) Environmental concentrations: Data collected should allow an assessment of hazards posed by the site to the surrounding environment.

(b) Potential Impact on Receptors: Data describing the human population and environmental systems that are susceptible to contaminant exposures can be assessed. Data on observed effects to ecosystems may also be obtained.

7.3.1.9 Biological/Ecological Investigations

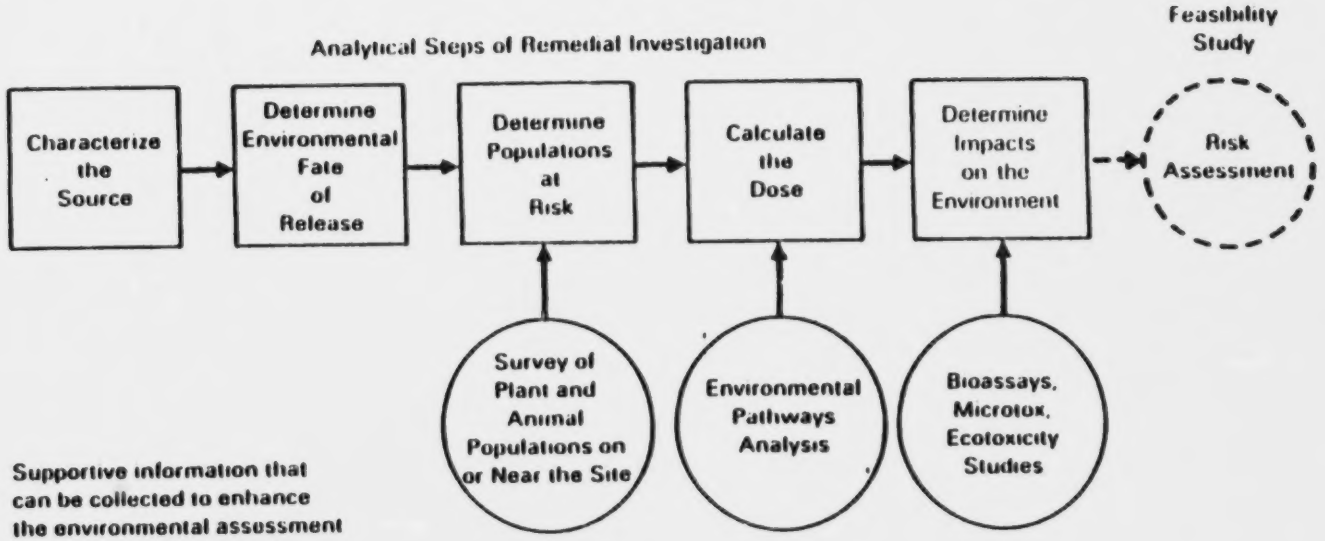
Biological and ecological information is collected for use in the endangerment and environmental assessments. The assessment should follow the guidelines of NEPA. The information should include identification of the site's fauna and flora, critical habitats, land use, water use and the distribution of water wells. See Figure 2.

7.3.2.3 Environmental Assessment

An Environmental Assessment is conducted during the Feasibility Study. The Remedial Investigation must provide data to

FIGURE 2

Supportive Information for Environmental Assessment


Analytical Steps of Remedial Investigation
Characterize the Source
Determine Environmental Fate of Release
Determine Populations at Risk
Calculate the Dose
Determine Impacts on the Environment
Feasibility Study
Risk Assessment
Survey of Plant and Animal Populations on or Near the Site
Environmental Pathways Analysis
Bioassays, Microtox, Ecotoxicity Studies
Supportive information that can be collected to enhance the environmental assessment

conduct an evaluation of the effects on the environment at or near a hazardous waste site. The Environmental Assessment should answer four questions:

-What chemicals have been or might be released to the environment?

-What are the concentrations and exposure levels of these chemicals?

-How does the environmental exposure occur?

-What is the significance? (EPA, 1985)

(See Figure 3)

Feasibility Study Guidance

The following are sections of the Guidance on Feasibility Studies under CERCLA (EPA/540/G-85/003 June 1985) which have a bearing on the protection of wetland ecosystems.

2.5.1 Environmental and Public Health Screening

The user should identify adverse impacts on the environment or on public health and welfare that may preclude the use of each assembled alternative. Alternatives that may have significant adverse impacts or not adequately protect the environment and public health should be eliminated.

4.1 Overview of Institutional Requirements

It is EPA policy that, in selecting remedial actions, primary consideration be given to remedies that attain applicable or relevant Federal environmental and public health standards. ARAR's listed in Feasibility Study Guidance, pertinent to wetlands follow:

Office of External Affairs: Guidelines for Specification of Disposal Sites for Dredged or Fill Material Sec. 404 (b)(1) guidelines. (40 CFR PART 230)

FIGURE 3

SUMMARY OF IMPORTANT ENVIRONMENTAL INFORMATION

Information Needed	Purpose or Rationale	Appropriate Collection Methods	
		Primary	Secondary*
Fauna and Flora	Determine potentially affected ecosystems; determine presence of endangered species	Public records of area plants and animals survey, survey of plants and animals on or near site, survey of site/ area photographs	Remote sensing, ground survey
Critical Habitats	Determine areas on or near site to be protected during remediation	Public records of site environment	Ground survey
Land Use Characteristics	Determine if terrestrial environment could result in human utilization, e.g., presence of game animals, agricultural land	Agricultural and development maps, site survey	Remote sensing, ground and aerial survey
Water Use Characteristics	Determine if aquatic environment could result in human utilization of water, e.g., presence of game, fish, recreational waters	Water resource agency reports, site survey	
Biocontamination	Determine observable impact of contaminants on ecosystems		Sampling and analysis, remote sensing

*May be appropriate if detailed information is required.

Other Federal Regulations:

-Executive Orders related to Floodplains (11988) and Wetland Protection (11990)

-Coastal Zone Management Act

Federal Requirements, Advisories and Procedures:

-Advisories issued by FWS and NMFS under the Fish & Wildlife Coordination Act.

-National Environmental Policy Act

State Requirements

Chapter 6 of the Feasibility Study Guidance continues with information on the evaluation of environmental impacts. In developing and evaluating alternatives, a major concern is adequate remediation and protection of the environment.

6.1 Environmental Assessment

Perform an Environmental Assessment (EA) for each alternative. The EPA should focus on the site problems and pathways of contaminants actually addressed by each alternative. The EA for each alternative will include, at minimum, an evaluation of beneficial effects of the response, adverse effects of the response and an analysis of measures to mitigate adverse effects. The no action alternative will be fully evaluated to describe the current site situation and anticipated environmental conditions if no actions are taken.

6.2.1.2 Improvement in Biological Environment

User should describe the remedial alternatives and likely improvements to the biological environment. The user should note the benefits of the alternative with regard to wetlands.

A wetlands assessment must be conducted as part of the feasibility study. EPA is preparing a formal policy for conducting wetlands assessments at Superfund sites.

6.2.2.1 Expected Effects of Remedial Alternatives
The user should identify and evaluate any expected adverse effects of remedial construction and operations. In identifying these effects, the user should especially consider sensitive environmental areas and resources people use.

6.2.2.2 Mitigative Measures
If any alternative appears to have significant inevitable or irreversible effects, the user should state the mitigative measures to be taken in conjunction with the alternatives. The statement should discuss the technology to be employed and its expected mitigating effects, (i.e., percentage reduction in adverse effects.) (EPA, 1985)

Components of the Superfund Remedial Process which follow the Feasibility Study are described below.

Record of Decision (ROD): The ROD is the offical EPA remedial action decision document. It should include a summary of EPA's activities to ensure that impacts to wetlands/water resources are properly addressed and mitigated.

Remedial Design (RD): Detailed plans and specifications for conducting the selected remedy are developed in the RD.

Remedial Action (RA): Phase in which the technical activity of the selected alternative is conducted. Unavoidable impacts to wetlands/water resources must be mitigated during the implementation phase of the CERCLA/SARA remedial action.

Operation and Maintence (O & M): State assumes responsibility for operation and maintance of the remedy once remedy is operational

and functional. EPA shares in the costs to ensure the state remedy is operational and functional for a period not to exceed one year.

Post Closure Monitoring: The State continues monitoring to ensure protectiveness of the remedy and EPA ceases all further site involvement and deletes the site from the NPL.

There is mention in the Remedial Investigation/Feasibility Study Guidances of sensitive ecosystems and the wetlands assessment requirement (Part 6.2.1.2). However, Federal Natural Resource Trustees have expressed concern that environmental protection requirements outlined in the RI/FS Guidances are not well defined and lack detail. CERCLA requirements of Trustee notification and mandatory coordination are not reflected in the Guidance. The brief provision for wetland assessments in the FS Guidance offers no direction to aid RPM's in actually performing assessments.

III. DOCUMENTATION OF PERTINENT LAWS

This section provides a definitive legal basis for understanding what must be done in terms of wetland protection at Superfund sites. There are seven major documents from which legal jurisdiction in this area is derived, the primary one being CERCLA/SARA. Throughout the process of this study, considerable ambiguity was identified surrounding the issue of wetlands on Superfund sites. This was traced directly back to differing interpretations or lack of familiarity of the subtleties of CERCLA/SARA, Executive Orders and Policy Statements that follow. This section provides a concise reference.

DOCUMENT 1

THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986. (CERCLA/SARA)] Following is a synopsis of sections, taken from the combined document entitled, as above: CERCLA of 1980 AS AMENDED BY SARA of 1986, with direct or peripheral bearing on wetlands.

"RESPONSE AUTHORITIES
SECTION 104 (b)(2) COORDINATION OF INVESTIGATIONS.-
The president shall promptly notify the appropriate Federal and State natural resource trustees of potential damages to natural resources resulting from releases under investigation pursuant to this section and shall seek to coordinate the assessment, investigations, and planning under this section with such Federal and State Trustees."

"SEC 104(j) ACQUISITION OF PROPERTY
(1) Authority - The President is authorized to aquire, by

purchase, lease, condemnation, donation, or otherwise, any real property or any interest in real property that the President in his discretion determines is needed to conduct a remedial action under this Act. There shall be no cause of action to compel the President to acquire any interest in real property under this act.

(2) State Assurance - The President may use the authority of paragraph (1) for a remedial action only if, before an interest in real estate is acquired under this subsection, the State in which the interest to be acquired is located assures the President, through a contract or cooperative agreement or otherwise, that the State will accept transfer of the interest following completion of the remedial action."

"NATIONAL CONTINGENCY PLAN

SEC. 105(a) The national hazardous substance response plan will establish procedures and standards for responding to releases of hazardous substances, pollutants and contaminants, which shall include:

(8)(a) Criteria for determining priorities among releases or threatened releases throughout the United States for the purpose of taking remedial action and, to the extent practicable taking into account the potential urgency of such action, for the purpose of taking removal action. Criteria and priorities under this paragraph shall be based upon relative risk or danger to public health or welfare or the environment, in the judgement of the President, taking into account to the extent possible the population at risk, the hazard potential of the hazardous substances at such facilities, the potential for contamination of drinking water supplies, the potential for direct human contact, <u>the potential for destruction of sensitive ecosystems, the damage to natural resources which may affect the human food chain and which is associated with any release or threatened release</u>, and other appropriate factors."

"LIABILITY

SEC. 107.(a) Notwithstanding any other provision or rule of law, and subject only to the defenses set forth in subsection (b) of this section:

(1) the owner and operator of a vessel or a facility,

(2) any person who at the time of disposal of any hazardous substance owned or operated any facility at which such hazardous substances were disposed of,

(3) any person who by contract, agreement, or otherwise arranged for disposal or treatment, or arranged with a transporter for transport for disposal or treatment, of hazardous substances owned or possessed by such person, by any other party or entity, at any facility or vessel owned or operated by another party or entity and containing such hazardous substances, and

(4) any person who accepts or accepted any hazardous substances for transport to disposal or treatment facilities, vessels or sites selected by such person, from which there is a release, or a threatened release, or a threatened release which causes the incurrence of response costs, of a hazardous substance, shall be liable for:

(c) <u>damages for injury to, destruction of, or loss of natural resources, including the reasonable costs of assessing such injury, destruction, or loss resulting from such a release</u>."

"SEC. 107 (f)(1) NATURAL RESOURCES LIABILITY -

In the case of an injury to, destruction of, or loss of natural resources under subparagraph (c) of subsection (a) liability shall be to the United States Government and to any State for natural resources within the State or belonging to, managed by, controlled by, or appertaining to such State: provided, however that no liability to the United States or State shall be imposed under sub-

paragraph (c) of subsection (a) where the party sought to be charged has demonstrated that the damages to natural resources complained of were specifically identified as an irreversible and irretrievable commitment of natural resources, in an environmental impact statement, or other comparable environmental analysis, and the decision to grant a permit or license authorizes such commitment of natural resources and the facility was otherwise operating within the terms of its permit or license. Sums recovered by the US Government or a State as trustee under this subsection shall be retained by the trustee, without further appropriation, for use only to restore, replace, or acquire the equivalent of such natural resources. The measure of damages in any action under subparagraph (c) of subsection (a) shall not be limited by the Sums which can be used to restore or replace such resources. There shall be no double recovery under this Act for natural resource damages, including the costs of damage assessment or restoration, rehabilitation, or acquisition for the same release and natural resource."

"SEC.107(f)(2) DESIGNATION OF FEDERAL AND STATE OFFICIALS
(A) Federal - The President shall designate in the National Contingency Plan published under section 105 of this Act the Federal officials who shall act on behalf of the public as trustees for national resources under this Act and section 311 of the Federal Water Pollution Control Act. Such officials shall assess damages for injury to, destruction of, or loss of natural resources for purposes of this Act and such Section 311 for those resources under their trusteeship and may, upon request of and reimbursement from a State and at the Federal official's discretion, assess damages for those natural resources under the State's trusteeship.
(B) State - The Governor of each State shall designate state

officials who may act on behalf of the public as trustees for natural resources and shall notify the President of such designations. Such State officials shall assess damages to natural resources for the purposes of this Act and such Section 311 for those natural resources under their trusteeship."

"SUBTITLE B - ESTABLISHMENT OF HAZARDOUS SUBSTANCE RESPONSE TRUST FUND. SECTION 221(C) EXPENDITURES FROM RESPONSE TRUST FUND. (C) claims for injury to, or destruction or loss of natural resources.... described in Section 111 (c)."

USES OF FUND
"Sec.111 (C) uses of the fund under subsection (a) of this section include -
(1) The costs of assessing both short-term and long-term injury to, destruction of, or loss of any natural resources resulting from a release of a hazardous substance.
(2) The costs of Federal or State or Indian Tribe efforts in the restoration, rehabilitation, or replacement or acquiring the equivalent of any natural resources injured, destroyed, or lost as a result of a release of a hazardous substance."

"Title V - Amendments of the Internal Revenue Code of 1986.
Part I - Superfund and Its Revenue Sources.
SECTION 514(B) REPEAL OF TRUST FUND - Section 232 of the Hazardous Substance Response Revenue Act of 1980 is hereby repealed."

"SUBTITLE C - POST-CLOSURE TAX AND TRUST FUND SEC. 232 POST-CLOSURE LIABILITY TRUST FUND. -
(B) Expenditures From Post-Closure Liability Trust Fund. - Amounts on the Post-Closure Liability Trust Fund shall be available only for the purposes described in Sections 107(k) and 111(j) of this Act."

"Sec.111(j) The President shall use the money in the Post-Closure Liability Fund for any of the purposes specified in subsection (a) of this section with respect to a hazardous waste disposal facility for which liability has transferred to such fund under section 107(k) of this act, and, in addition, for payment of any claim or appropriate request for costs of response, damages, or other compensation for injury or loss under Section 107 of this Act or any other State or Federal law, resulting from a release of a hazardous substance from such a facility."

SEE PREVIOUS NOTATION OF SEC. 107(a)(4)(c).

"Sec. 122 Settlements

(j) Natural Resources

(1) Notification of Trustees--Where a release or threatened release of any hazardous substance that is the subject of negotiations under this section may have resulted in damages to natural resources under the trusteeship of the United States, the President shall notify the Federal natural resource trustee of the negotiations and shall encourage the participation of such trustee in the negotiations.

(2) Covenant not to Sue--An agreement under this Section may contain a covenant not to sue under section 107(a)(4)(c) for damages to natural resources under the trusteeship of the United States resulting from the release or threatened release of hazardous substances that is the subject of the agreement, but only if Federal natural resource trustees have agreed in writing to such covenant. The Federal natural resource trustee may agree to such covenant if the potentially responsible party agrees to undertake appropriate actions necessary to protect and restore the natural resources damaged by such release or threatened release of hazardous substances." (CERCLA/SARA, 1986)

DOCUMENT #2

ADMINISTRATOR'S DECISION STATEMENT NO. 4 FEBRUARY 21, 1973.
SUBJECT: EPA POLICY TO PROTECT THE NATION'S WETLANDS

This document states that it shall be the Agency's policy, "a) to give particular cognizance and consideration to any proposal that has the potential to damage wetlands, to recognize the irreplacable value and man's dependence on them to maintain an environment acceptable to society, and to preserve and protect them from damaging misuses. b) to minimize alterations in the quantity and quality of the natural flow of water that nourishes wetlands and to protect wetlands from adverse dredging or filling practices, solid waste management practices, siltation or the addition of pesticides, salts or toxic materials arising from non-point source wastes and through construction activities, and to prevent violation of applicable water quality standards from such environmental insults."

DOCUMENT #3

POLICY ON FLOODPLAINS AND WETLAND ASSESSMENTS FOR CERCLA ACTIONS AUGUST 5, 1985

Under this policy Superfund actions must meet the substantive requirements of the Floodplain Management Executive Order (E.O. 11988) and the Protection of Wetlands Executive Order (E.O. 11990). This memo discusses situations that require preparation of a floodplains or wetlands assessment, and the factors which should be considered in preparing an assessment, for remedial actions undertaken pusuant to section 104 or 106 of CERCLA.

The Policy For Remedial Actions follows:

A floodplain/wetlands assessment must be incorporated into the

analysis conducted during the planning of remedial actions. During the scoping of remedial actions, the Remedial Project Manager (RPM) or the lead Agency in conjunction with Regional 404 staff, should identify any floodplain or wetlands located within the site area or that could be affected by the response action. (404 staff refers to EPA personnel who work with wetland permitting under section 404 of the Clean Water Act). If there are no floodplains/wetlands located within the site area or that could be affected by a response action, the Feasibility Study should so state, and the response action may proceed without further consideration of the procedures set forth below. However, if the site is located within a floodplain/wetland, the RPM or the lead agency must conduct a floodplain/wetland assessment which will be integrated into the Feasibility Study. Floodplain/wetland assessment shall consist of a description of the alternatives considered and their effects on the floodplains and wetlands, and measures to minimize potential harm to the floodplain/wetland if there is no practicable alternative to locating in or affecting the floodplain/wetlands.

Wetland Assessment of Alternatives

"In assessing the alternatives and their effects on wetlands, the RPM or lead agency in conjunction with the Regional 404 staff, should consider such factors as environmental effects, community welfare, cost and technology. All possible alternatives must be considered, including the no action alternative. If one or more of the alternatives will be located in a wetland, those alternatives may not be selected unless a determination is made that no practicable alternative exists outside the wetlands.

If no practicable alternative exists outside the wetlands, and the RPM or lead agency has determined or proposes to allow a remedial action to be located in a wetlands, then the RPM or lead agency shall act to minimize potential harm or to avoid adverse effects to the wetlands. This includes action to allow restoration and preservation of the natural and beneficial values of

the wetlands. All impacts caused by an action occuring in a wetland must be evaluated and mitigated according to the EPA mitigation policy (under the authority of the Clean Water Act section 404)." (EPA, 1985)

DOCUMENT #4

EXECUTIVE ORDER 11990 PROTECTION OF WETLANDS MAY 24, 1977

Executive Order 11990 requires Federal agencies in carrying out their repsponsibilities "to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. The order emphasizes the importance of avoiding undertaking new construction located in wetlands unless there is no practicable alternative to that construction, minimizing the harm to wetlands if the only practicable alternative requires construction in the wetland, and providing early and adequate opportunities for public review of plans and proposals involving new construction in wetlands." (Carter, 1977)

DOCUMENT #5

U.S. ARMY CORPS OF ENGINEERS REGULATORY GUIDANCE LETTER
JULY 5, 1985 SUBJECT: SUPERFUND PROJECTS

This guidance was developed in response to EPA's position that CERCLA actions need not obtain permits under Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act. The letter directs appropriate COE personnel not to require permit applications for actions proposed under the authority of CERCLA.

DOCUMENT # 6

FISH AND WILDLIFE COORDINATION ACT (FWCA) (AS AMENDED)

Briefly,"the FWCA recognizes the vital contribution of our wildlife resources to the Nation, the increasing public interest and significance of fish and wildlife to expansion of our national economy and other factors. Also the FWCA provides that wildlife conservation shall receive equal consideration in coordination with other features of "water-resource development programs", interpreted broadly to cover any Federal project or permit affecting waters and wetlands." If the project will impact water resources under FWCA, the agency must consult with appropriate State and Federal wildlife agencies to determine necessary mitigative measures.

DOCUMENT #7

CLEAN WATER ACT OF 1972 (CWA) AS AMMENDED (33 USC 466) 404 (b)(1) Guidelines For Specification Of Disposal Sites For Dredged Or Fill Material (40 C.F.R. Part 230)

The 404 (b)(1) Guidelines establish substantive environmental criteria for 404 activities and set forth the "water-dependency" and "practicable alternatives" tests that are designated to steer development away from wetlands, in particular, and "other waters" in general. The guidelines establish, among others, the following rules:

"a) No permit will be issued if there is a practicable alternative to the proposed discharge that would have less adverse impacts on the aquatic ecosystem (40 CFR Sec. 230.10 (a)(1));

b) To be practicable an alternative must be both available

or reasonably obtained and feasible for the overall project purpose. (40 CFR Sec. 230.10 (a)(2));
c) For non-water dependent activities in special aquatic sites(i.e. wetlands) the guidelines assume that practicable alternatives exist and that the alternatives will have less adverse impact on the aquatic ecosystem (40 CFR Sec. 230.10 (a)(3)). 404 permits aren't required for Superfund Remedial Program actions, however, the Superfund process must emulate the 404 (b)(1) Guidelines, substantively."(EPA, 1972)

IV. COORDINATION BETWEEN EPA OFFICES

Major intra-agency coordination activities in the area of wetland protection on Superfund sites involve the Offices of Water, and of Policy, Planning and Evaluation. The type and extent of coordination is highly variable in regions across the nation. To a large degree, cooperation and coordination efforts are voluntary. The following description is based on experiences in EPA's Region II.

A. Office of Water - Wetland Protection Branch

The Office of Water assists the Office of Emergency & Remedial Response primarily in two ways:

1) Document review and comment.
2) Provision of in-house expertise and resources for a number of substantive areas such as ground water, water quality and wetlands.

Superfund documents are routed through the Office of Water for review and comment. Depending on the specific nature and severity of problems at individual sites, documents may be reviewed by any combination of the following branches: Ground Water Protection, Marine & Wetland Protection, Drinking Water, Surface Water and Water Quality. When necessary, a lead contact person is assigned to a site, providing advice and expertise to the Regional Project Manager. The Marine and Wetland Protection Branch reviews Superfund documents and provides comments from a "protective" standpoint on various cleanup alternatives and mitigation practices. Other that these document reviews that routinely done, coordination between ERRD and the Wetland Protection Branch is done largely on an "as needed" basis. The Wetlands staff is available if Regional Project Managers need assistance in identifying, delineating or evaluating wetland ecosystems on their sites. Resources such as county

soil surveys, to aid in defining wetland boundaries, and the National Wetland Inventory maps, to aid in determining types of wetlands present, are available through the Wetland Protection Branch.

In each EPA Region, one staff person has been hired as a Superfund liaison. This person works in the Wetlands Protection Branch and is responsible for reviewing all Superfund sites that have wetlands associated with them.
Additional coordinating functions may include:

1) Wetland training sessions administered by Wetlands staff for Regional Project Managers.
2) Superfund site visitation by Wetland staff person.
3) Wetlands staff may aid in the negotiation of meetings with Potentially Responsible Parties.
4) Wetlands staff are frequently participants in Biological Assessment Work Group meetings, if they exist in the Region.

In speaking with Superfund liaisons in the Office of Water, the following concerns were raised;

1) Standardized criteria are needed for Biological Assessment.
2) Resources of Wetland Protection Branch are not fully utilized by Superfund personnel.
3) Contractors and often Regional Project Managers, are not conversant with wetland principles and terminology.
4) Wetland training sessions for RPM's were suggested to aid in transfer of wetland identification and delineation techniques.
5) Increased coordination and cooperation between Superfund and the Office of Wetland Protection is essential to the protection of wetlands on Superfund sites.

B. Office of Policy, Planning and Evaluation - Environmental Impacts Branch/NEPA Compliance

Coordination between the Environmental Impacts Branch and Superfund revolves around the issue of compliance with the National Environmental Policy Act. NEPA (42 U.S.C. 4321) requires that all agencies of the Federal Government to the fullest extent possible carry out the provisions of NEPA by building into agency decision making appropriate and careful consideration of the environmental effects of proposed actions, and avoiding or minimizing the adverse effects of these actions. The environmental impact statement (EIS) requirement under section 102(2)(c) serves as the most significant mechanism for implementing NEPA. Superfund activities (e.g. the RI/FS) and many other EPA activities (e.g. RCRA permits) have been exempted from EIS applicability by Congress and the courts. This exemption, known as "functional equivalency," applies to regulatory actions where the Agency's work product constitutes the functional equivalent of a NEPA review. Two criteria must be met:

1) The agency's authorizing Statute must provide "substantive and procedural standards that ensure full and adequate consideration of environmental issues."
2) The agency must afford an opportunity for public participation in the evaluation of environmental factors prior to arriving at a final decision. (Environmental Review Manual, 1987)

The Environmental Impacts Branch reviews Superfund documents to determine if environmental assessments are adequate and in fact "functionally equivalent" to NEPA requirements, and to the requirements of other environmental statutes.

Theoretically, Superfund remedial actions seem to satisfy the first criterion in light of section 104(a)(1) of CERCLA which directs that remedial actions be "necessary to protect public health or welfare and the environment." Concerning the second criterion, Section 117 of CERCLA/SARA establishes a mechanism for public participation whereby, before adoption of any plan for

remedial action, four procedures for notification of the public must be implemented.

In practice, however, the "functional equivalency" determination is contingent upon the adequate structuring of remedial actions to satisfy the requirements for environmental assessment and public participation. It is necessary for the Environmental Impacts Branch to review all Superfund documents thoroughly for compliance in these areas. (See Appendix H for procedural details of EIB/ERRD coordination)

V. COORDINATION WITH FEDERAL AGENCIES/STATES

A. Natural Resources Trusteeship

When natural resources are lost or damaged as a result of a discharge of oil or as a release of hazardous substances, officials are designated to act as Federal Trustees pursuant to section 111(h)(1) of CERCLA and Section 311 (f)(5) of the Clean Water Act for purposes of sections 111(h)(1),111(b), and 107 (f) of CERCLA and section 311 (f)(s) of the Clean Water Act.

Federal Natural Resources Trustees include: Department of Commerce, Department of Interior, U.S. Department of Agriculture, U.S. Department of Defense (on site only), U.S. Department of Energy (on site only), or the head of any other single entity designated by it to act as trustee for specific resources. States may only act as trustee for natural resources within the boundary of a State or belonging to, managed by, controlled by, or appertaining to such State as provided by CERCLA.

Natural Resources Trusteeship is a critical component in the Superfund-wetlands area, definitely the most important when incorporated into a Bioassessment Work Group forum. (See section VII) Trustees provide a variety of functions on Superfund sites in accordance with their responsibilities to protect various resources. Trustees often initiate studies of impacts on wetlands, provide expertise throughout the study period and make recommendations for mitigative measures and compensation for wetland losses.

Section 300.74 of the National Contingency Plan (July 1986) describes the responsibilities of trustees:

(a) The Federal Trustees for natural resources shall be

responsible for assessing damages to the resources in accordance with regulations promulgated under section 301(c) of CERCLA, seeking recovery for the costs of assessment and for the losses from the person responsible or from the Post Closure Liability Trust Fund, and for designing and carrying out a plan for restoration, rehabilitation or replacement or acquisition of equivalent natural resources pursuant to CERCLA. Note, however, that the Superfund Revenue Act of 1986 prohibits use of Superfund funds to pay for natural resource damages.

(b) The trustee may, upon notification, take the following actions as appropriate:

(1) request that the lead agency issue an administrative order or pursue judicial relief against parties responsible for the release, as authorized by CERCLA Section 106;

(2) request that the lead agency remove or arrange for the removal or provide for remedial action with respect to any hazardous substance from a contaminated medium, as authorized by CERCLA section 104;

(3) initiate actions against responsible parties under CERCLA section 107 (a); or

(4) pursue a claim against the Hazardous Substance Superfund for injury,destruction, or loss of natural resources as authorized by CERCLA section 111 (when this option is selected, a plan for restoration, rehabilitation, or replacement or acquisition of equivalent natural resources must be adopted pursuant to section 111 (i) of CERCLA. (NCP, 1986)

(c) Where there are multiple trustees, because of co-existing or contiguous natural resources or concurrent jurisdictions, they shall coordinate and cooperate in carrying out the responsibilities.

Natural resources are broadly defined in CERCLA sec.

101(16) to include:..."land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to or otherwise controlled by the United States (including the resources of fishery conservation zones established by the Fishery Conservation and Management Act of 1976), any State or local government, any foreign government, any Indian tribe, or, if such resources are subject to a trust restriction on alienation, any member of an Indian tribe." The biota or biological resources are further defined as fish and wildlife, including marine and freshwater aquatic and terrestial species, game, non-game, and commercial species; and threatened and endangered and state sensitive species.

The following CERCLA/SARA provisions affect EPA and trustees:

A) EPA is required to promptly notify Federal and State natural resources trustees of potential damages to natural resources at Superfund sites and to seek to coordinate assessments, investigatons and planning with the trustees. (Section 104 (b)(2)). This requirement applies to both removal and remedial actions, and to enforcement, fund lead and state lead sites.

B) EPA is required to notify Federal Natural Resource Trustees of negotiations with potentially responsible parties, if the release of hazardous substances may have resulted in damages to natural resources under the trusteeship of the United States; and to encourage the participation of the trusteeship in the negotiations. (Section 122 (j)(1)).

C) The Federal Trusteeship may agree to a covenant not to sue (a release from damage claims) only if the Potentially Responsible Party agrees to undertake appropriate actions necessary to protect and restore the natural resources damaged by the hazardous materials released. (Section 122 (j)(2)).

1. Department Of Commerce

The Department of Commerce (DOC) designated the National Oceanic & Atmospheric Administration(NOAA) to implement Natural Resources Trusteeships. In each EPA Region with coastal resources, a NOAA Coastal Resources Coordinator has been appointed and is funded through Superfund. This person coordinates all Superfund - Department of Commerce activities in the Region.

The objective of this coordination is to protect coastal resources and ecosystems and to help EPA address human health risks asociated with the bioaccumulation and transfer of toxicants through the marine food chain.

NOAA will assist EPA by identifying, evaluating and mitigating the adverse affects of hazardous substances on coastal resources and supporting ecoystems from all sources including hazardous waste sites. NOAA will help on a continuing basis in developing information on risks to natural resources from hazardous waste sites and on effective mitigative strategies during all stages: site investigation, removal and remedial planning, implementation or remedies. It is the aim of NOAA to provide scientific support for remedial and removal operations at hazardous waste sites, specifically:

1) Develop environmental sampling strategies.
2) Help in designing and implementing analytical techniques (i.e. bioassays).
3) Calculate fate and transport of contaminants in the environment.
4) Define methods of risk assessment.
5) Identify target levels protective of the environment.
6) Recommend mitigation strategies that address environmental damage.
7) Determine technical adequacy of investigations; and the extent of contamination with respect to environmental

impacts.

8) Evaluate the potential for unfavorable effects on natural resources.

9) Identify remedial alternatives that include actions to protect and restore natural resources.

The NOAA Coastal Resources Coordinator(CRC) has support from the NOAA Hazardous Materials (HAZMAT) staff which consists of:

1) Air and surface water trajectory modelling group.

2) Environmental sampling and biological analyses group.

3) Chemistry and field instrumentation group.

4) Site weather monitoring group.

The NOAA trusteeship includes NOAA and non-NOAA managed resources:

1) Living and non-living resources for which it has management or protective responsibility under various resource statutes. This covers primary trusteeship for:

A) Coastal environments (salt marshes, tidal flats, estuaries) and all fishery resources of the exclusive economic zone(EEZ) and continental shelf. (The Magnuson Fishery Conservation and Manangement Act, 16 U.S.C. 1801-1882; 16 U.S.C. 1801(b)(1)).

B) Rivers or tributaries to rivers that support anadromous species (and catadromous fish) throughout their range. (The Atlantic Tuna Convention Act, 16 U.S.C. 971a-i; the Pacific Salmon Treaty Act, 16 U.S.C. 3631-44; the Atlantic Striped Bass Conservation Act, 16 U.S.C. 1851).

C) Endangered and threatened species, including critical habitat and marine mammals whose responsibilities are assigned to NOAA. (The Marine Mammals Protection Act, 16 U.S.C. 1361-1407; the Whaling Convention Act, 16 U.S.C. 91-1961, and the Fur Seal Act of 1966, as ammended, 16 U.S.C. 1151-1187.)

D) Tidal wetlands and other habitat for fishery and

marine resources (Sec. 404 (c) of the Clean Water Act,(33 U.S.C. 1344(c)); the Fish and Wildlife Coordination Act,(16 U.S.C. 661-666); Title 2 of the National Ocean Pollution Planning Act (U.S.C 1701-1709). Also resources for which other agencies (including the Army Corps of Engineers and EPA) have management authority. This covers wetlands and estuaries.

E) Resources protected by marine sanctuaries (Research and Sanctuaries Act,(33 U.S.C. 1441-1445)

F) Commercial or recreational marine fishery resources (16 U.S.C. 1801-1882).

Co-trusteeship with Department of Interior

G) Certain endangered species (Endangered Species Act (16 U.S.C. 1531-1543).

Co-trusteeship with States

H) Fishery resources and endangered species in state waters.

I) Resources in estuarine research reserves. (Sec. 315 Coastal Zone Management Act(16 U.S.C. 1461).

2. Department of the Interior (DOI)

The DOI has duties as one of several natural resources trustees authorized by Superfund, and designated in Executive Order 12580 and the National Contingency Plan.

Resource concerns of the Department of the Interior fall under the following services:

A) U.S. Fish and Wildlife Service (FWS)

1. Migratory birds
2. Anadromous fish
3. Endangered plants and animals

4. Critical habitats
5. National Wildlife Refuges

B) National Park Service
1. National Parks
2. National Seashores
3. National Recreation Areas
4. National Historical Sites
5. National Battlefields

The Office of Environmental Project Review (OEPR) is assigned the principal responsibilities of the DOI under CERLCA. OEPR has oversight, coordination, and guidance responsibilities. The activities of OEPR include representing the DOI on the National and Regional Response Teams, coordinating response managenment in the field and necessary preparedness and planning activities. In addition, OEPR provides a Department wide reporting capicity for overall budget and policy determinations. At headquarters, the office works especially closely with the Solicitor's Office, the Budget office, and staff throughout the Department having jurisdiction and/or expertise relevant to Superfund responsibilities.
The office is allocated 54 positions, all of which are involved in one way or another with the Superfund program. About 31 full time equivalents are devoted to this activity.

DOI responsibilities under Superfund fall into two categories (1) response and (2) trusteeship for natural resources. Each of these categories is subdivided into two main kinds of activities.

(1) Response. a) The Department provides response assistance along with other Federal agencies at spill incidents or sites as members of the National and Regional Response Teams, as spelled

out in the National Contingency Plan. The focus of these activities is natural resources, and DOI provides technical expertise in water resources issues, fish and wildlife habitat, etc. b) The DOI responds to spill incidents or uncontrolled hazardous waste sites on its own lands, in compliance with Superfund provisions for Federal facilities.

(2) Trustee for Natural Resources. Federal Trust Responsibilities under CERCLA are narrowly drawn to encompass only those natural resources which the Federal government manages or protects under specific authorization.

a) Trustee responsibilities begin once DOI discovers or is notified pursuant to the NCP that there is a potential for natural resources injury as a result of a spill or release of hazardous substance. The trustee activities may be those leading to a natural resources damage assessment, whereby DOI would develop a claim for damages to be brought in court; or the trustee activities may include participating in negotiations with PRP's, along with EPA, the Department of Justice and any other natural resource trustees, for natural resources rehabilitation measures or other compensation for agreed upon injuries, to be undertaken at the same time as remedial action or following thereafter.

b) Interior also has the duty under Superfund section 301(c) to study and promulgate regulations for the assessment of damages for injury to, destruction of, or loss of natural resources resulting from a release of oil or a hazardous substance. CERCLA 301(c)(2) requires that such regulations specify: 1) standard procedures for simplified assessments requiring minimal field observation, including establishing measures of damages based on units of discharge and 2) alternative protocols for conducting assessments in individual cases to determine the type and extent of short and long-term injury, destruction or loss. Such regulations shall identify the best available procedures to determine

such damages, including both direct and indirect injury and destruction or loss, and shall take into consideration factors including, but not limited to, replacement value, use value and ability of the ecosystem or resource to recover. These regulations must be used if the trustees presenting damage claims in court wish their claim to have the force and effect of a rebuttable presumption. Trustees may elect to conduct damage assessments without using the DOI's damage assessments rules, but if they do so, they will not be entitled to the rebuttable presumption (See sub-section 3 on Natural Resource Damage Assessment.) The responsibilities of the Department of Interior, whether (1) response or (2)trustee activities, have some degree of overlap--the need for fish and wildlife biological expertise or groundwater expertise may apply to all activities mentioned.

The three subsections following describe additional trustee responsibilities of the Department of the Interior and the Department of Commerce. The fundamental objective of these activities is to aid in the identification, protection and and compensation of natural resources.

Sub-section 1

Preliminary Natural Resource Surveys (PNRS)

The PNRS procedure was developed by the Department of Interior in 1983. It was deemed valuable to develop a regular procedure whereby DOI would be notified in a timely manner of EPA plans for negotiations with Potentially Responsible Parties, so that DOI could, in turn, provide EPA with a response as to whether or not site information warranted the DOI to be willing to grant a release. A memorandum was signed in September of 1983. It initiated the PNRS procedure. The surveys done under this MOU are specifically oriented to

support EPA's negotiations with responsible parties by reviewing available information on a site to determine if there are resources which DOI manages or protects in the area and if there are logical pathways or other information to indicate that these resources might have been injured by releases at that site. The MOU was updated in December of 1987 to conform it to SARA. The MOU covering PNRS procedures has a narrow purpose. It is to effect a quick screen by Interior, usually with no special study or sampling, on sites selected by EPA, to make a determination about possible Interior concern for the site. If there is no evidence of potential injury to natural resources protected by DOI, EPA is so informed and EPA can then proceed without DOI to negotiate a settlement representing the Federal interest. DOI does not actually release until they've had the opportunity to review the consent decree. The end of the survey process is a letter to EPA indicating the position of DOI with respect to a release from damage claims.

In February of 1988, Proceedures for Using Generic Interagency Agreements Detween DOI and EPA and NOAA and EPA were drafted. The agreement outlines a process whereby funding is provided to DOI/NOAA for projected annual needs of Preliminary Natural Resource Surveys. The scope of work is repetitive and is usually for a small dollar value (less than $6000.00 per site)

Preliminary Natural Resource Surveys are most often initiated by EPA, but can also be initiated by the Department of Commerce and the Department of the Interior. The Trustees may have a responsibility for natural resources affected by any site, therefore DOI/DOC initiated PNRS are performed in addition to those requested by EPA. The basic question becomes whether or not to conduct a damage assessment, rather than whether or not to release the PRP from claims. The report of a DOI/DOC intiated PNRS is in the form of a memorandum to Department files.

Sub-section 2

Releases From Natural Resource Claims

When EPA's case against a Potentially Responsible Party is ready for settlement or court action, the Department of Justice requests a release from natural resource damage claims, by letter to the Solicitor of the Department of Interior or the Department of Commerce. At that time, DOI and/or DOC staff review their records and examine any new information available on the site including the draft consent decree and supporting documentation. If the PNRS letter to EPA deemed that the trustee was willing to grant a release and no new information is found to change that position, the Solicitor sends a letter to Justice, which empowers Justice to act on the Departments' behalf in the settlement or court action. If the trustee has remaining concerns, an alteration of the basic letter of release may confine release to the specific terms of the consent order and any documents i.e. the ROD or Remedial Action Plan, where the mechanics or the standard of the cleanup are a condition of the release. If a partial release cannot be given, the remaining option is to decline the release altogether, which will begin the damage assessment process.

Sub-section 3

Natural Resource Damage Assessment

CERCLA provides for the recovery of damages for injuries to natural resources resulting from a discharge of oil or release of hazardous substances, (section 107(a)(c). Pursuant to CERCLA section 301(c) and Executive Order 12316, the Department of Interior published final Natural Resource Damage Assessment Regulations on August 1, 1986 and on March

20, 1987. The regulations are for the use of Federal and State Trustees for natural resources. These procedures can be used in court actions or administrative proceedings when seeking compensation from the responsible party for injuries to natural resources for which the trustee has responsibility. The regualtions provide guidance for choosing between type A and B assessments. The type B procedures are relatively general and they provide for flexibility needed to meet the diversity of resources, ecosystems, oils and hazardous substances likely to be encountered. They do not provide specific procedures for selecting and implementing assessment methodologies, although they do provide objectives and criteria.

The type A procedures use a computer model called the "Natural Resource Damage Assessment Model for Coastal Marine Environments". In this model, natural resources injury is determined through the physical fates and biological effects submodels. Damages are determined through the use of an economic damages submodel.

In order for a trustee to conduct a NRDA, they must have access to all pertinent information related to contamination and the site and the proposed remedial actions. The trustee may not make a claim for damages until a remedial action has been selected. The Trustees are constrained by CERCLA/SARA and may not grant a release unless the Potentially Repsonsible Party agrees to undertake appropriate actions necessary to protect and restore the natural resources damaged. (Section 122 (j)(2)). (Environmental Review Manual, 1987) See appendix for synopsis of NRDA trustee involvement process.

State Trusteeship

CERCLA Section 107 (f)(2)(B) discusses state trusteeship. The Governor of each state shall designate State officials who

may act on behalf of the public as trustee for natural resources under this Act and section 311 of the Federal Water Pollution Control Act, and shall notify the President of such designations. Such State officials shall assess damages to natural resources for the purpose of this Act and such section 311 for those natural resources under this trusteeship. Section 300.73 of the NCP provides that states may act as trustee for natural resources within the boundary of the State or belonging to, managed by, controlled by, or appertaining to such State as provided by CERCLA.

In some States officals haven't been designated as trustees for natural resources and, overall, there has not been consistent involvement of States as natural resource trustees. More involvement is anticipated as the Superfund 301 (c) natural resource damage assessment regulations are used. At sites where damage assessments are done, DOI and/or DOC may be joint trustees with the State. A Memorandum of Understanding would be drafted site by site, to include all trustee agencies and including all resources at stake from that site.

Following are comments and concerns raised by personnel of the Department of the Interior, the Fish and Wildlife Service and the National Oceanic and Atmospheric Administration.

In speaking with DOI personnel, the following issues prevailed.

1) The average Regional Project Manager's career is two years. This coupled with high turnovers in Superfund Management positions leaves Superfund with little or no institutional memory. The entire process is continually rehashed with RPM's and attorneys.

2) The Department of Interior is developing a department-

wide guidance concerning Superfund remedial action notification and response procedures. It will be geared toward individual RPM's and will insure that EPA has a better understanding of the responsibilities and concerns of DOI...hopefully fostering understanding and coordination. The document is due out in draft in the Fall of 1988.

3)DOI is very concerned that greater recognition be given in EPA documents/guidance to the requirements of the Fish and Wildlife Coordination Act.

4) Expertise from FWS should be "in house" at EPA, along with NOAA.

5) FWS Contaminant Specialists should be attending RI/FS training courses.

The following comments of Donald Hodel, Secretary of the Interior are from correspondence to the Honorable Gerry Studds, Chairman, Subcommittee on Fisheries and Wildlife and the Environment. (January 29, 1988)

Donald Hodel comments on Natural Resource Damage Assessments: "The lack of damage assessments or referrals should not be taken as lack of success. The significant value of the formal damage assessment process is to provide a very disciplined approach to situations where resources are injured. The procedures provide an orderly way to arrive at timely decisions about the steps to be taken in spill situations or at Superfund sites, without necessarily going all the way to preparing and presenting claims in court. The availability of the damage assessment procedures makes it clear to Potentially Responsible Parties that in many cases a cooperative negotiated effort will be worth the alternative of a long court claims procedure. For the natural resource trustees, negotiated arrangements can

mean more timely action, coordinated with the overall cleanup activities." (Hodel, 1988) An example of this kind of arrangement is the MOTCO Site in Texas, where an agreement was negotiated for acquisition and rehabilitation of a wetland area comparable to that affected by releases from the site. EPA, DOI, FWS and NOAA were involved, and the actions agreed to formed an appendix to the consent decree. (Hodel, 1988)

Conversations with Fish and Wildlife Personnel resulted in identification of the following major concerns:

1) FWS needs early notification and coordination by Superfund. Notification should happen during the RI/FS scoping phase and coordination should continue throughout the Superfund process.

2) Regional Project Managers are not fully aware of the role of Natural Resource Trustees. The high turnover of RPM's makes continuity difficult.

3) Bioassessment work groups are perceived to be extremely valuable...they can be a forum for early identification and subsequent early rectification of issues of concern.

4) Guidance is needed in the areas of Bioassessment and sediment quality criteria.

5) It would be valuable to have a FWS staff person working on Superfund coordination, in house at EPA.

6) While the Department of Interior gets funding from Superfund, relatively small amounts reach the field offices of FWS. The FWS has enough resources to be primarily "reactive", lacking money and manpower.

7) Congress's prohibition of the use of Federal funds for natural resources damages or assessment of injuries, has resulted in a situation where Natural Resources Damages Assessments are never done because there is no money for them. Out of necessity, settlements are negotiated in more cost and time effective ways.

Conversations with NOAA Coastal Resources Coordinators revealed the following major concerns:

1) More quantitative direction is needed from the Office of Wetlands Protection. It is not clear how high contamination to the environment would have to be in order for EPA to respond. Standards have been set for drinking water, primarily. Sediment quality criteria are essential for managing wetland ecosystems and are non-existent.

2) The effects of mixtures of toxic materials are virtually unstudied. There is a need to move toward the study of contaminants, away from single pollutants, about which there is more information available.

3) NOAA, as trustee for natural resources, needs early notification and proper coordination from Superfund. Involvement and coordination with NOAA should begin at the work plan stage. All subsequent Superfund documents should be sent as they become available. Once information is provided, the trustees should decide if they have jurisdiction.

4) Regional Project Managers need guidelines on eco-risk assessment.

5) Bioassessment Work Groups reduce coordination burdens.

6) Regional Project Managers need to be sensitized to the issues and concerns of trustees.

VI. MITIGATION

The complexities inherent in the concept of wetland mitigation are many. "Superfund wetlands" (wetlands either directly or indirectly associated with Superfund sites) compound the complexity. This section will identify constraints, discuss EPA's present stance on mitigation via the Clean Water Act's 404 Program, and offer recommendations.

The definition of mitigation as given in the National Environmental Policy Act regulations (40 CFR Part 1508.20 a-e) follows: Mitigation can be: a) avoiding the impact altogether by not taking a certain action or parts of an action; b) minimizing impacts by limiting the degree or magnitude of the action and its implementation; c) rectifying the impact by repairing, rehabilitating or restoring the affected environment; d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and e) compensating for the impact by replacing or providing substitute resources or environments. (NEPA, 1969) Mitigative measures are those that seek to avoid or minimize impacts through project modification or compensate for impacts that are unavoidable.

The basic approaches for mitigating wetland losses follow: 1) avoid wetland altogether; 2) apply various measures for reducing damage or destruction; 3) restore the damaged wetland or attempt to recreate it elsewhere; 4) acquire a wetland at some other location to compensate for damages or destruction (does not directly reduce or compensate for loss) (Kusler, 1986)

Constraints in applying mitigation approaches range in severity and include: a) high degree of confusion in basic terminology (i.e. restoration, creation, compensation); b) limited information is available to help evaluate the effectiveness of various mitigation proposals and their impacts on wetland functions; c) if original wetland functions and characteristics (pre-impact) are not known,

it is difficult to define to what extent mitigation needs to be done; d) how can it be determined how much impact/damage to wetland ecosystems on Superfund sites is "acceptable" given the fact that public health is necessarily the primary concern? e) should compensation be "value for value" whereby every attempt is made to duplicate the original wetland? Or, should compensation be "acre for acre" or both?

John Kusler, director of the Association of State Wetland Managers feels that part of the problem is due to the fact that available knowledge concerning impact reduction and restoration/creation has been only partially translated into formal regulatory policies or guidelines due in part to lack of consensus on scientific isues and lack of awareness by regulators of the status of scientific knowledge. (Kusler, 1986)

Section 404 of the Clean Water Act is the primary Federal program that regulates activities affecting wetlands, hence providing for their protection. The Army Corps of Engineers is the Federal permitting Agency for discharges of dredged and fill material. These discharges are the primary mandate of Section 404. Discharges into "waters of the United States" (includes most wetlands) must be Federally permitted. The EPA has promulgated environmental guidelines known as the 404(b)(1) guidelines. The Corps must follow these guidelines in its decision making process for permitting. The 404(b)(1) guidelines have more regulatory "clout" over Superfund wetlands than any other single guidance. They require various steps to be taken in the 404 process in order to protect existing wetland resources and compensate for losses which are unavoidable. These steps include avoidance, minimization and compensation and should be followed sequentially (Meagher, 1986)

There are two major loopholes that directly affect the utility of Section 404 in dealing with Superfund wetlands. 1) CERCLA Section 121(e) exempts any response action conducted entirely on-site from having to obtain a Federal, State or local permit, where the action is carried out in compliance with Section 121. In general,

on-site actions need to comply only with the corresponding administrative requirements (i.e. CWA 404 permits). Off-site actions must comply with all legally applicable requirements, both substantive and administrative. The fact that on-site Superfund actions are exempt from CWA permit requirements weakens the protection of Superfund wetlands. In light of the vast array of concerns at Superfund sites, the primary one being public health, coupled with the lack of a "binding" permit requirement for on-site actions, leaves decision making, to determine if the substantive aspects of the 404 (b)(1) guidelines are being met, largely subjective.

2) The second factor that weakens the application of Section 404 to Superfund wetlands revolves around 404's regulatory mandate: the discharge of dredge or fill material into the waters of the United States. The 404(b)(1) guidelines define "fill material" as all pollutants which have the effect of fill, that is, which replace part of the waters of the United States with dryland or which change the bottom of a water body for any purpose. The guidelines define "pollutants" as, among other things, dredged spoil, solid waste and chemical wastes. While it can be assumed that many Superfund actions would involve dredge and fill operations, there are a multitude of other ways Superfund wetlands can be impacted. These include migration of hazardous wastes through groundwater and surface water pathways and other processes that are not under the "dredge and fill" category. It is then assumed via review of the law and interpretations from 404 personnel that Superfund wetlands that aren't impacted by dredge and fill activities have limited protection under Section 404 of the Clean Water Act.

In summary, mitigation of wetlands on Superfund sites is in its earliest stages. This is evidenced by the lack of definitive understanding of wetland functions and characteristics, particularly when compounded by contamination; the untested nature of mitigation practices themselves and the differences in interpretation of existing laws, guidances and other ARARs. At present, when Potentially Responsible Parties and Superfund Regional Project

Managers inquire about the circumstances under which mitigation is an appropriate response to legal requirements, the answer is in many senses, ill defined, subject to a high degree of site specificity and differing interpretations of laws. While Section 121 of SARA requires compliance with ARARs, the uniformity issue is complex due to the fact that each state has its own set of ARARs. When the question, "If mitigation is appropriate, how much and what kind should be provided?" is asked, the answer is far from definitive. Again reliance is placed on site specificity, which is necessary to some extent, and on case-by-case interpretations within the existing ARAR structure, which can result in compliance with the laws of each State.

Recommendations include:

1) The goals of mitigation, in all of its forms, need to be defined.
2) Available scientific information needs to be utilized to aid in the evaluation of the effectiveness of mitigation practices. New studies need to be initiated and carried out to fill data gaps.
3) Uniform interpretations of existing laws and ARARs must be applied, in compliance with the laws of each State.
4) Consistency and cooperation among agencies and within agencies on the issue of mitigation is necessary for enhanced communication and effectiveness.
5) A regulatory policy for mitigation that will include specific provisions for dealing with wetlands that are either directly or indirectly associated with Superfund sites.

The Superfund Wetlands Protection Process can be summarized by the diagram on the following page.

Superfund Wetland Protection Process (Simplified)

The initial question to determine is the source of impact/damage to the wetland ecosystem. On Superfund sites impact/damage may be a result of past contamination by chemical wastes inherent in the site or from the construction phase of the Superfund Remedial Action.

A. PAST CONTAMINATION

POTENTIAL TO IMPACT/DAMAGE/
--------DESTPOY WETLANDS ----------

1. IDENTIFIABLE POTENTIALLY RESPONSIBLE PARTY

2. DAMAGE ASSESSMENT NEGOTIATION

3. COMPENSATION FOR WETLAND LOSSES

1a. NO IDENTIFIABLE POTENTIALLY RESPONSIBLE PARTY

2a. MITIGATIVE REMEDY EMPLOYED

3a. COMPENSATION FOR WETLAND RESOURCES

B. CONSTRUCTION PHASE OF REMEDIAL ACTION

1. POTENTIAL TO IMPACT/DAMAGE/DESTROY WETLANDS

2. LEAST DAMAGING ALTERNATIVE CHOSEN

3. COMPENSATION FOR WETLAND LOSSES.

VII. BIOASSESSMENT

This section will discuss the potential role of bioassessment in the Superfund remedial process and the Bioassessment Work Group concept as an implementing entity. Bioassessment procedures use well defined tests with biological organisms to determine the biological sensitivities to contaminated soil or water samples from hazardous waste sites. (Porcella, 1983) The assessment of environmental effects resulting from hazardous waste sites requires both chemical and biological analysis to estimate potential exposure and biological effects. While an important first step in the characterization of hazardous waste sites, chemical analyses by themselves often yield minimal information on impacts or potential impacts to natural resources. (Long and Chapman, 1985; Thomas et al.1986; Wall and Hanmer, 1987). Many biologically active compounds are not measured or detected in the standard chemical analysis conducted at waste sites. Remedial Project Managers may find that bioassessment, coupled with chemical analysis, will enhance site characterization, providing a more definitive picture of risks to the environment in addition to risk to human health. Bioassessment may be particularly useful in detecting the presence of toxic materials for which there are no standard chemical analyses, predicting the interactive toxic effect of complex mixtures of chemicals, and intergrating the effects of the environmental variables and contaminants present at a site on natural resources. Bioassessment technique categories include: bioassays, community level effects, effects on individual organisms and bioaccumulation. (Christopherson et al., 1987)

Bioassessment Work Groups can provide a forum for implementing decisions involving bioassessment on Superfund remedial sites. The concept evolved in January of 1986 after being founded in EPA Region III and has become established in EPA Region II as well.

Other Regions are expressing considerable interest but none have made formal commitments.

Bioassessment Work Groups are interagency peer review groups formed to provide technical recommendations to Superfund remedial project managers concerning bioassessment and natural resource concerns. Recommendations to EPA RPMs will assist in the process of fully defining the nature and extent of on-site and off-site contamination and the potential biological and ecological impact of a site's contaminants.

Work groups generally meet monthly to discuss sites that all participants are familiar with. Work group chairmen provide all relevant portions of Superfund documents for review in advance. Site reviews include: 1) Defining site situation clearly and identifying ecological concerns 2) Listing data needs to determine the extent of contamination 3) Giving specific recommendations from natural resources perspective 4) Deciding on timely, appropriate recommendations that will address concerns 5) Identifying bioassessment techniques.

It is not mandatory for Regional Project Managers to participate in this process and the recommendations are no more than strong suggestions. To date, participation and implementation of suggestions have not been a major point of contention.

The work groups consists of representatives from the U.S. EPA Environmental Response Team, Environmental Services Division and Water Management Division; from the Department of Interior/U.S. Fish and Wildlife Services and the Office of Environmental Project Review; the National Oceanic and Atmospheric Administration; and technical representatives of State Natural Resource Agencies.

Alyce Fritz, the NOAA Coastal Resources Coordinator for EPA Region III and active member of the Bioassessment Group there, says the work group evolved due to the mutual environmental concerns for protection of natural resources and the need for combined technical input to the Superfund program for a more efficient and cost-effective process. Objectives of the Region III Group follow:

1. to provide the EPA project manager with a set of comprehensive

technical recommendations for sampling at hazardous waste sites in order to assess environmental effects and to ensure technical adequacy of the Remedial Investigation;

2. to provide a technical transfer forum for hazardous waste site project managers in new and existing methods of environmental assessment, biological monitoring and trajectory modelling;
3. to ensure that other Federal agency concerns, that is, specific species or habitats are addressed at hazardous waste sites;
4. to enhance coordination among various Federal and state agencies (as required by the NCP) and to avoid duplication of work and costs;
5. to incorporate environmental concerns in the remedial actions; and
6. to address questions of protection and restoration of natural resources (as required by NCP and SARA) in development of the remedy. (Fritz, 1987)

The aim with regard to wetlands is to review Superfund documents and identify wetlands for wetland delineation and environmental assessment very early in the process (draft work plan stage), providing continous review thru the RI/FS stage into Remedial Design.

VIII. NATIONAL SURVEY OF REGIONAL PRACTICES

This survey addresses the issue of wetland protection at Superfund remedial sites. The survey was directed to Superfund branch chiefs in all regions of EPA. In several cases an individual who had a particular familiarity with the area was appointed to speak for the region. The first three questions, and responses are tabulated by region and illustrate relative degrees of Superfund site/wetland interface. For six of the ten regions, a substantial degree of interface was documented. The interpretation of results follows, portraying levels of interface, familiarity across the nation, and methods employed. The interpretation will not be region-specific. The substantive nature of replies was deemed to be more valuable than documentation of the issue in terms of geographical trends, at this time. Each survey question is stated below, but the answers are composite in nature.

Results of Questions 1,2 and 3:

Region	Question 1 # Superfund NPL remedial sites at present	Question 2 % of these sites with wetlands directly or indirectly associated	Question 3 of these sites, how many have or will include wetland assessment
1	59	95-100	All
2	110	75-80	n/a
3	134	67	42%
4	150	55-65	10%
5	45	75	All
6	56, Texas only	40	10%
7	42	0	0
8	n/a	25-30	5%
9	99	10	All
10	55	50-55	20%

It should be noted that Regions 7, 8, and 9 have 30% or less of sites with wetlands and thus the answers showing the number of

Regions familiar with wetlands is biased since at least two of the Regions have little need to be familiar with this issue. This "bias" carries through for responses to all questions.

Question 3. Of the sites with wetlands, how many have or will include a wetland assessment? Six regions were not readily familiar with the wetland assessment concept. Section 6.2.1.2 of the Guidance on Feasibility Studies under CERCLA states that a wetlands assessment must be considered as part of a feasibility study. The Policy on Floodplains and Wetland Assessment for CERCLA Actions states how and when to incorporate a wetlands assessment into the remedial process and describes what the content of a wetland assessment should be. The regions that were more familiar with the concept stated that if you have a wetland, a wetland assessment must be done. The complexity of the assessment will vary depending on the type and severity of impacts to the site.

Question 4. In the Superfund remedial process, do RPMs seek data and information that will aid them in determining if a wetland assessment is necessary or are they provided with this information? Five of the regions stated that RPMs were provided with this information and were responsible for seeking out additional information.

Question 4a. When does notification of potential impacts to natural resources on a site take place?

Four Regions stated that notification of Natural Resource Trustees and relevant Divisions happened as early as possible in the process, usually in the Workplan, RI scoping phase, or as soon as potential impacts to wetlands are identified. These regions were those with active or pending Biological Assessment Work Groups. The remaining six regions had no formal notification network and four of these had little or no familiarity with section 104 (b)(2) which requires prompt notification of the appropriate Federal and State natural resource trustees of potential damages to natural resources.

Question 5. In how many cases have the results of a wetlands assessment precipitated a decision to mitigate for wetland losses? The general consensus here was that Superfund remediations themselves are wholly "mitigative" in nature. In many cases source control and contaminant practices prove to mitigate impacts to wetlands. With regard to extensive mitigation as in wetland restoration and creation, only a handfull of cases were identified around the county, with the Motco site in Texas being the most well-known.

Question 6. What, specifically, are decisions based on whether or not to mitigate/restore wetlands? This question was posed to get an idea of the degree of familiarity with ARAR's in this area. Five regions had a working knowledge of pertinent ARARs. One region stated that all decisions on whether or not to mitigate wetlands were determined on site specific data alone. States have ARARs and standards of widely varying stringency, and the States' involvement also varies widely. Among the Regions most familiar with the subtleties of the ARARs there was a general consensus expressed that the ARARs are not specific enough or well-defined with regards to wetland mitigation. The lack of definitive criteria for contaminated soils/sediments is seen as an impediment to the protection of wetlands. The remaining regions had considerably less awareness of the ARARs.

Question 7. Are there remedial action sites in your region where wetland mitigation is being or has been undertaken ? Sixteen sites around the country have been identified as being in the process of mitigating particularly for wetland losses. Mitigative measures on these sites will include a wide range of practices including: enhancement, restoration, revegetation, replacement and creation.

Question 8. Briefly outline the interagency interactions that take place when a wetland is identified as impacted by a

Superfund remedial action. This question was developed for the purpose of 1) determining, again, the degree of familarity with the interagency coordination process; and 2) to identify effective methods and constraints in interagency cooperation and communication.

Four regions had substantial familiarity with interagency interactions concerning wetlands. These happened to be the same regions that have or are on the verge of establishing Bioassessment Work Groups. This interagency group, comprised of personnel from EPA, NOAA and DOI technical experts and trustee representatives, reviews draft work plans and identifies wetlands for wetland delineation and environmental assessment beginning very early in the process and continuing through the Remedial Design phase. The Bioassessment Work Group appears to be the single most effecetive method for incorporating Trustee involvement into the Superfund remedial process. Coordination and communication are both more cost-effective and time-effective using this forum. Of the six regions remaining, five were not fully aware of section 104(b)(2) and 107(f)(2) of CERCLA which require notification of and coordination with Natural Resources Trustees. Three regions were of the opinion that trustee coordination has the effect of slowing the Superfund process substantially. Trustees are perceived as having a single purpose, where Superfund has many responsibilites and constraints. It is felt that in some instances trustees don't consider/understand the complexities inherent in Superfund.

Question 9. Does the "lead status" (remedial or enforcement) affect decisions of whether or not to mitigate for wetland losses ? Five regions stated that the lead status has no bearing on these decisions. The other five stated that while decisions on whether or not to mitigate probably would not be affected, the extent and type of mitigation could be determined

as a function of the project lead status. Three regions felt that PRP-lead sites would incorporate more extensive, protective and thus, more costly mitigative measures than if the sites were fund lead. However it was also recognized that often mitigation of wetlands is the first thing to drop out of PRP negotiations. The remanining two regions felt that the extent of mitigation would differ, but were not sure how.

Question 10. Are Wetland training sessions for Superfund perceived to be a potentially valuable part of the process ? Nine regions responded to this question with an emphatic "yes". Three of these regions have had Superfund wetlands training offered by either Wetlands Protection or NEPA compliance personnel, and have found it to be valuable.

Question 11. Do you see wetland mitigation banking as a viable alternative for compensation of impacted wetlands associated with Superfund sites ? [Mitigation banking is an innovative way of mitigation in which off-site wetlands are created or preserved to compensate for on-site losses.] Four regions said they would prefer not to have mitigation banking on their list of viable alternatives. Reasons included: possibility of loss of higher value wetlands on habitats where wetlands are vital, regional loss of wetlands, legality of the concept under CERCLA and the potential for loss of diversity. Three regions stated that banking is a potentially viable alternative if no on-site alternative exists and extreme care is taken and value of wetlands is maintained in the bank. The remaining four regions felt that while mitigation banking is an interesting concept, not enough is known about it to determine its viability in terms of Superfund wetlands, or otherwise.

Question B1) Do you feel that threats to wetland ecosystems at Superfund remedial action sites have been/are being adequately identified ? Seven regions stated that they did

not feel that threats to wetlands were being adequately identified. The two regions with operating Bioassessment Work Groups stated that threats to wetlands were being identified adequately.

Question B2. Will you comment on the shift in agency thinking from a stance of human health protection to include a more stringent consideration of risks to the environment ? Nine regions stated that a shift has been evolving that has increased focus on the environment as its driving force.

Question B3. Will you identify administrative constraints concerning the implementation of wetland mitigation ? Major constraints identified follow: 1) vague policies, guidance and lack of an institutionalized framework for dealing with wetlands on Superfund sites; 2) difficulty getting Natural Resources Trustees to respond with valid concerns; 3) lack of mechanism for early and continuous cooperation and communication with other agencies; 4) lack of monetary resources for costly environmental expenditures, public health has priority; 5) complexity of Superfund's mandate is a constraint, in that often those involved from different agencies aren't familiar enough with it; 6) wetlands can be difficult concept to sell to resposible parties, and thus difficult to negotiate.

Question B4. What are your candid views on the relative necessity of wetland mitigation on Superfund remedial action sites ? Comments on this question ranged from..."Funds are needed for the protection of public health, we can't sacrifice them for environmental protection", to "wetlands are just one piece to juggle", to "wetlands are the most sensitive ecosystems we have. The earth revolves around wetlands."

IX. Work In Progress

This section will briefly describe projects presently being undertaken that are substantively related to the issues of wetland mitigation and wetland protection on Superfund sites.

A. The Environmental Research Laboratory (ERL) in Corvallis, Oregon is in the midst of preparing a "Mitigation Handbook" to assist EPA 404 personnel in evaluating mitigation projects. The project is being carried out by the Wetlands Research Team and is organized into three general tasks: 1) synthesize the knowledge on wetland creation and restoration; 2) compile 404 permit information on wetland creation and restoration; 3) compare created and "naturally occurring" wetlands. It is estimated that this effort will be completed in October, 1989.

B. Dr. Jon Kusler, Association of State Wetland Managers, along with the EPA Wetlands Research Team, is involved in compiling information on wetland creation and restoration which will develop into a Provisional Guidance Document for personnel involved in 404 permitting. The document will be peer reviewed and is expected in Fall of 1988.

C. A third study being undertaken by the Corvallis Wetlands Research Team will attempt to answer the question, How "clean" should a wetland be? The research effort will aid the Office of Wetlands Protection in setting criteria for water quality in wetlands. The study is in the planning phase at present; a research effort based on the plan will be implemented in FY 89.

D. A Wetland Creation-Restoration Bibliographic Data Base is being developed by the Inland Freshwater Ecology Section, National Ecology Center, U.S. Fish and Wildlife Service, in Fort Collins, CO. Karen Schneller-McDonald is the primary

contact person for this project. The effort is being initiated as a result of the considerable controversy concerning the most appropriate and efficient techniques to employ. The data base will also serve as a literature resource for the National Ecology Center to support ongoing and planned research and development projects concerned with the creation and restoration of the ecologic functions and values of wetlands. The data base information will be available for purchase, upon its completion.

E. Mr. William Ives of the Office of Water at EPA headquarters is involved in a project to gather definitive information concerning the extent to which Superfund National Priority List Sites are in or directly impact wetlands.

F. Andrea McLaughlin of the ICF Corporation in Vienna, Virginia has been contracted by the EPA's Office of Policy, Planning and Evaluation to identify potential or observed ecological impacts from Superfund sites. The study is being conducted region by region, utilizing information from personnel of EPA, NOAA and FWS; and includes substantial document review.

G. Craig Zamuda of EPA's Office of Policy Planning and Evaluation is involved in an Eco-Risk program. The main objectives of this effort are to 1) determine the extent of ecorisks posed by environmental problems under CERCLA and RCRA; 2) determine the availibility and applicability of current ecorisk assessment methods; and 3) identify both the basis for past ecorisk management decisions and critical unresolved management issues (i.e., defining acceptable risk, weighing eco vs. human health concerns). This OPPE effort will complement several other Agency initiatives, including the Ecotoxicity Guidance Document and the Superfund Environmental Evaluation Manual.

H. John Bascietto of the Office of Waste Programs Enforcement (HQ) and Pat Mundy of the Office of Emergency and

Remedial Response (HQ) are preparing an Environmental Evaluation Manual for Superfund Sites. The purpose of the manual is to provide gudiance for an approach useful to EPA regional personnel for conducting the environmental effects portions of Superfund studies. The bioassessment work group model, exemplified and pioneered by EPA Region III, is the basis for the Guidance, which proposes the use of bioassessment protocols as a first step in determining which sites require detailed biological investigations.

I. Risk Tools is a microcomputer software system being developed by the Hampshire Research Institute in Alexandria, Virginia. The system is designed to help state and EPA personnel assess RCRA and Superfund facilities. One of the major analytical tools of this system allows use of the data base information to estimate the probable risks posed by the environmental distribution of chemicals. An environmental partitioning model enables the user to determine the environmental media in which a chemical may accumulate. Other tools include: exposure assessment and risk characterization.

J. Diane Niedzialkowski of the Office of Policy Planning and Evaluation (HQ) is chairing a Superfund Mitigation Workgroup. The goal of this group in a broad sense is to define what is needed for better mitigation of environmental values at Superfund sites via identification of points within the RI/FS process were natural resource and ecological data should be gathered to facilitate better mitigation at settlement. At the last meeting this workgroup had (summer 88) it was determined that not enough case studies existed in this area to pursue under the origianl goal. The group has changed direction and will now focus on compilation of case studies relevant to the topic.

K. Bob Hargrove of the Office of Policy and Management in EPA Region II has initiated a manual entitled the CERCLA/SARA Environemtal Review Manual. It is intended to assist EPA

remedial project managers in ensuring that CERCLA/SARA remedial actions are functionally equivalent with the National Environmental Policy Act and comply with the reqirements of other environmental statues. Training is offered on the contents of this manual.

L. Lyndon Lee of the Office of Wetland Protection (HQ) and the Savannah River Ecology Laboratory is offering training on Superfund Wetlands: "Best Management Practices for Contaminants in Saturated Media". This course is one week long and is expected to be offered in Spring of 1989.

X. CONCLUSIONS AND RECOMMENDATIONS

The issue of wetland protection on Superfund remedial sites is becoming increasingly salient, as wetlands are being identified in high numbers in these areas. The present legal structure does have the capacity to protect Superfund wetlands, though only through strict interpretation of existing laws, guidances and policy statements. The problem is not entirely a function of the existing legislation; but also of the "newness" of the issue, the conflicting statutory missions of the Agencies involved and the fact that contractors and often Regional Project Managers, are not conversant with wetland principals and terminology. EPA has experienced a high turnover rate among Regional Project Manager; the turnover rate has made it difficult for EPA to retain its "institutional memory." The entire process of wetland assessment, mitigation and the role of natural resource trustees is continually rehashed with RPMs and attorneys. Concerning mitigation technologies, we are in a mode of heightening awareness, without enough scientific knowledge to proceed with surety.

Recommendations include the following:

1) A single Policy Statement that definitively collects and outlines existing legal requirements and concerns for the protection of wetlands, and the environment as a whole on Superfund sites. This Policy should be reflected in Guidances for Regional Project Managers. A uniform interpretation of existing ARARs is not being achieved under the present framework.
2) The goals of mitigation in all of its forms need to be defined.
3) Available scientific information needs to be compiled

and utilized to aid in the evaluation of the effectiveness of mitigation practices. New studies need to be initiated and coordinated with existing work in this field to fill data gaps.

4) Increased cooperation, communication and coordination between agencies and within the Environmental Protection Agency are essential to the protection of wetlands. Mechanisms for these activities should be reflected in Policies and Guidance.

5) Bioassessment Work Groups should be mandatory in all Regions and have one or two individuals funded full-time to coordinate for the Group. This Group can provide effective communication and data collection early in the Remedial Process which will result in better mitigation for ecological impacts.

Many questions remain....Is EPA meeting ARARs and carrying out appropriate mitigation on Superfund sites? Why has compensation for injury of wetlands been made a feature in so few Records of Decision? How clean is clean for the environment? Less that 2% of the more than 65,000 chemicals in commerce have been adequately tested for their effects on human health and the environment....

This many faceted issue will not be placated by a new comprehensive Policy Statement alone. It will take combinations of tactics, ideas and a long-lasting commitment by all Agencies and individuals involved to ensure the protection of wetlands on Superfund Remedial Sites.

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List of Contacts

A. EPA Emergency & Remedial Response Division--Superfund personnel

B. EPA Headquarters - Office of Wetland Protection, Office of Policy, Planning & Evaluation

C. Department of Interior, Fish & Wildlife Service

D. National Oceanic and Atmospheric Administration

E. Office of Water--Wetlands Protection Branch

F. Office of Policy & Management--Environmental Impacts Branch

G. Biological Assessment Groups

H. Wetland Restoration/Creation Research Facilities

I. Additional Contacts

A.

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A Wetland Assessment Procedure for Superfund Sites

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ABSTRACT

Wetland assessments must be performed at Superfund sites where remedial activities are expected to alter the ecosystems. The purpose of these studies is to determine the functional values (e.g., wildlife habitat, groundwater recharge and discharge, flood storage and critical habitat for endangered species) of impacted wetlands.

Superfund sites present unique challenges in wetland assessment because in many cases their natural ecosystems have been dramatically altered by disposal of hazardous waste. Adjacent wetlands also may have played an important role in pollution attenuation, protecting nearby ecosystems from the effects of contamination. In addition, the impacts of proposed remedial activities such as landfill capping or removal of contaminated materials must be determined, and it may be necessary to implement mitigative measures such as replacement of wetlands that have been disturbed by disposal or remedial actions.

This wetland assessment procedure examines ecosystem, wildlife habitat, hydrologic, water quality and socioeconomic functions. It also determines the extent and current impacts of contamination, evaluates the potential impacts of remedial alternatives and, where necessary, develops appropriate mitigative measures. This information is critical for preparation of Endangerment Assessments and Feasibility Studies conducted under Superfund for any site that contains a wetland.

For a 70-acre Superfund site in Massachusetts that generates an estimated 33 million gallons of leachate per year, this procedure was used to determine the functional values of, and impacts to, 14 surrounding wetlands as well as the pollution attenuation capacity of a large cattail marsh. These data were used to develop mitigative measures that minimized the adverse impacts of the proposed remedial action (capping with a synthetic membrane) on adjacent wetlands while reducing the volume of leachate generated by 99%.

INTRODUCTION

Because wetlands traditionally were regarded as useless land, they became the preferred location for garbage dumps and, eventually, sanitary landfills. Until recently, there has been little concern for the eventual fate of the materials disposed there. At one time certain wetlands, if they were formed by a naturally impervious layer such as a clay deposit, were considered relatively good disposal areas because they would restrict the migration of wastes. However, if wetlands with complex regional or local hydrologic connections are used for waste disposal, contamination in one wetland can spread to other wetland areas and aquifers.

The U.S. EPA is charged with protection of public health and welfare and the environment but historically has directed much of its resources toward public health concerns. Recently, however, there has been a greater focus on protection of the environment on ecological grounds. Consequently, investigations at Superfund sites may require a wetland assessment to determine the impact of contamination on the environment.

Table 1
Steps in a Wetland Assessment

```
PREPARATION
     Working Map of Wetlands
     Background Materials

FIELD INVESTIGATION
     Verify Wetland Boundaries
     Collect Field Data
          Ecosystems
          Wildlife Habitat
          Hydrology
          Water Quality
          Socioeconomic
     Record Observed Impacts

DATA INTERPRETATION
     Evaluate/Rank Wetland Functional Values
          Ecosystems
          Wildlife Habitat
          Hydrology
          Water Quality
          Socioeconomic

EVALUATION OF CURRENT IMPACTS
     Chemical Impacts
     Physical Impacts

EVALUATION OF REMEDIAL ALTERNATIVES
     Effect on Wetland Functional Values
     Develop Mitigative Measures
```

A wetland assessment is generally one step in the RI/FS process. Although it includes information germane to RIs, FSs and Endangerment Assessments (EAs) (Fig. 1), it usually is prepared as a separate document. A wetland assessment may also be performed to evaluate the impacts of remedial measures already taken at a site. In any case, its purpose is to appraise wetlands at a site in terms of their functional values, to determine the environmental impacts of contamination and remediation, and to develop recommendations to avoid or minimize these impacts.

PREPARATION

The procedure begins with a review of existing data for the site to determine the location of the wetlands. Maps from the National Wetlands Inventory (NWI), the USGS, Soil Conservation Service (SCS) and local government are the most useful sources. Older editions of maps can be helpful if they show features that have since changed, such as an area that has been mined for gravel or

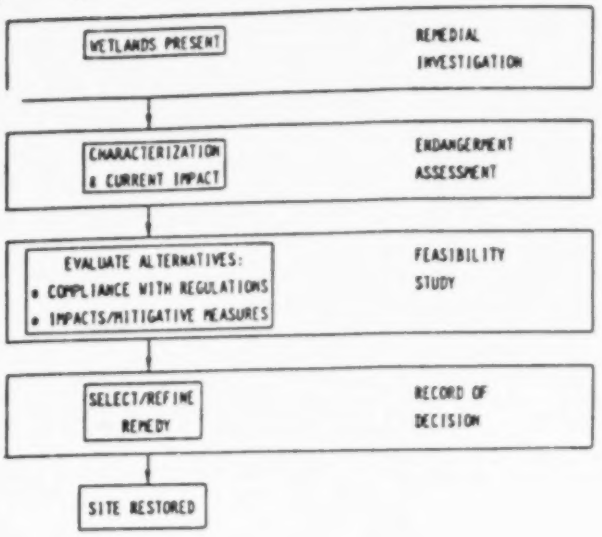

Figure 1
Wetland Assessments and Superfund.

a wetland that is now filled in. Aerial photos, if available, are especially valuable because they can provide historical data for comparison, particularly in cases where filling or other physical alterations have occurred. Data gathered as part of an RI can be helpful, too.

If the site has not been surveyed, USGS maps can provide a base map onto which wetland boundaries from the corresponding NWI map can be overlain. Wetland soil types shown on local SCS maps can be used to refine the study area and to determine boundaries if an NWI map is not available. In some areas, local zoning maps include wetland boundaries, although these maps are of variable quality and accuracy. Finally, aerial photos can help pinpoint areas of special concern. Once evaluated and summarized, these data are used to prepare a map of the area for use in the field and to select potential investigation or sampling points.

Geologic maps and hydrologic data are also reviewed to select additional field observation points. For example, geologic features such as fracture zones and regional groundwater flow data (e.g., direction and rate) can be used to predict where water-soluble contaminants might be transported and thus focus the investigation toward such areas.

Other preliminary work includes tabulation of plant and animal species expected to occur in the vicinity of the site based on data from State and Federal agencies, organizations such as universities and conservation groups, and desk references. Data regarding endangered species, including designated critical habitat areas, can be obtained from the U.S. F&WS and state Natural Heritage Programs. These lists are used in the field as checklists that may be easily summarized and evaluated later.

FIELD INVESTIGATION

In the field, wetland boundaries that have been plotted on the working wetland map are verified and modified as necessary. The U.S. EPA defines wetlands by three criteria:

- A predominance of obligate or facultative wetland plant species as classified by the U.S. F&WS[1])
- Hydric soils (those formed under wet conditions, including histosols [organic soils] and soils in aquic suborders)
- Hydrologic regime

All three of these conditions should be met for the U.S. EPA to classify an area as a wetland.

In many cases, the presence of wetland plant species provides sufficient information to determine the wetland boundaries. Documents such as Cowardin, et al.[2] are also helpful in determining wetland types. However, if there is any doubt as to whether a particular location is within a wetland, at least one soil pit is dug to verify the boundary by the presence or absence of hydric soil such as muck, peat or marl. The soil also is examined for evidence of wetland hydrologic regime such as mottling (patches of red oxidized and grey reduced iron) or gleying (grey color from reduced iron). If needed, site-specific hydrologic data are also used to verify wetland boundaries.

If the Wetland Assessment is being conducted as part of an RI, the boundaries may be flagged and incorporated into the site map by the survey team. If the mapping has been completed, the locations of wetland boundaries are noted in the field and later added to the site map.

The vegetation at each observation point is quantitatively evaluated in terms of % cover in each stratum (tree, shrub, herb and emergent) and overall % age of wetland species; productivity, species composition and diversity and suitability for wildlife habitat (food, cover and breeding area) are ranked on a qualitative high/medium/low or good/fair/poor scale. Observed plant and animal species are recorded.

Depending upon the site, it may be desirable to survey open water areas for benthic macro-invertebrate population density and diversity. In addition, water temperature, dissolved oxygen and pH may be measured. If it becomes apparent that other areas are worth investigating (for example, a peripheral area or one too small to be shown on available maps), these observation points are added in the field.

Each observation point is qualitatively assessed in terms of hydrologic functional values including: groundwater recharge and discharge; water purification and filtration; flood storage and retardation and shoreline protection. Any sign of recreational or socioeconomic use, such as hunting or fishing, also is noted.

Finally, the area is examined for evidence of environmental impacts. These impacts can include: leachate seeps; areas of stressed or dead vegetation; drainage alterations; severe erosion or sedimentation; and the presence of opportunistic plant or animal species. Monocultures of certain plants such as the reed *Phragmites* may indicate ecosystem stress. If possible, the origin of disturbance (physical or chemical) is determined.

INTERPRETATION OF FIELD DATA

The data collected in the field are first summarized and examined for trends. The locations of wetland boundaries are transferred onto the site map if this has not been done by the survey team. Summary tables of plant and animal species noted in the field are prepared. Observation points are then evaluated in terms of wetland functional values[3] which are grouped into five categories:

- Ecosystem Functions—Primary production, decomposition, nutrient export and nutrient transfer
- Wildlife Habitat Functions—Density and number of vegetative strata, floral diversity, "edge" (the transition between two plant communities) and food production
- Hydrologic Functions—Groundwater recharge and discharge, flood storage and retardation and shoreline protection
- Water Quality Functions—Sediment trapping, oxygen production, nutrient storage and removal and contaminant storage and removal
- Socioeconomic Functions—Aesthetic, recreational, educational, scientific, historic and economic values

Each observation point or wetland area is ranked in terms of relative functional value using a high/medium/low or good/fair/poor hierarchy. It is inappropriate to use numeric

rankings because this process invites comparison of unrelated values, such as flood storage and wildlife habitat.

EVALUATION OF CURRENT IMPACT

Evaluation of current impact is a feature unique to wetland assessments at Superfund sites. However, it is often difficult to determine whether observed impacts are due to physical changes (such as filling, draining and regrading) or chemical contamination. Generally, physical impacts are more easily observed. Some, such as sedimentation, are quite obvious while others, like drainage alterations, are more subtle because their effects may manifest themselves very slowly. Many times the vegetation at a site provides little indication of change. For example, Atlantic white cedar (*Chamaecyparis thyoides*) is extremely sensitive to alterations in hydrologic regime and even small changes in drainage may be fatal, although other species in the same area are unaffected.

Chemical contamination is more difficult to discern, because its effects are often similar to those induced by other plant stresses. For example, stressed vegetation near a highway that runs past a site may be suffering from exposure to ozone, road salt or hazardous substances. In addition, some plants show little sensitivity to contamination: cattails (*Typha spp.*), a common wetland species, are quite tolerant of pollutants, including heavy metals,[4, 5, 6] and can even grow in leachate seeps.

EVALUATION OF REMEDIAL ALTERNATIVES

Wetland assessment at a Superfund site usually calls for evaluation of remedial alternatives. Such alternatives may range from capping the contaminated area, with only minimal impact to adjacent wetlands, to removal of all contaminated material, including the wetlands. Another possible alternative is a pump-and-treat facility that removes contaminated groundwater, treats it and returns it to a groundwater or surface water system.

The recommended alternative should be consistent with U.S. EPA policy as promulgated in its 404(b)(1) guidelines and Executive Order 11990. Normally, avoidance of impacts is preferable to mitigation. But in the case of Superfund sites, damage usually has already occurred, and virtually any mitigation will be an improvement over current conditions. However, it is still possible to evaluate alternatives in terms of their potential alterations of wetland functional values.

Most remedial alternatives will have both positive and negative effects on wetland functions. For example, a pump-and-treat facility may improve water quality and at the same time drain a wetland, or construction of a sedimentation basin may eliminate nutrient and sediment loading to receiving waters while reducing wildlife habitat. Clearly, some losses will likely be associated with cleanup, but the recommended remedial alternative should avoid impacts to the extent practicable and provide compensation for lost wetlands on a one-for-one basis.

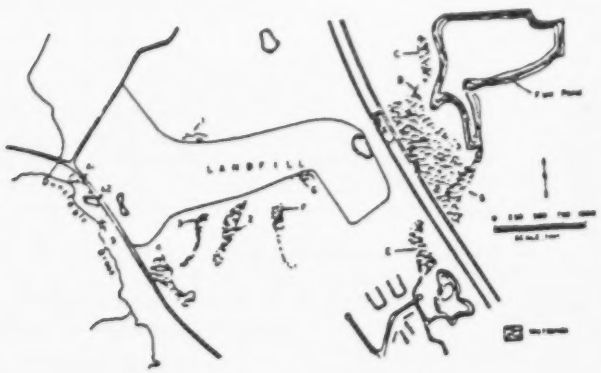

Figure 2
Superfund Site, Landfill and Associated Wetlands

CASE STUDY

Fourteen wetlands were located within the study area for a 70-acre Superfund site in Massachusetts (Fig. 2). This site began as a burning dump in the 1950s and ultimately became a municipal landfill that accepted chemical waste. Off-site migration of volatile organic compounds and metals contaminated and forced the closure of bedrock wells at a nearby condominium complex. In addition, contaminated groundwaters and surface waters, landfill runoff and leachate seeps contaminated two streams and several nearby wetlands.

As of 1985, the landfill contained about 4 million yd^3 of material and was estimated to generate over 33 million gal of leachate/year. Wetlands 1, 3, 5, 6, A1 and A2 (Fig. 2) exhibited obvious signs of contamination (e.g., dark leachate or stains, oil films amd chemical odors), although plant stress was observed only in Wetland 6. Although dead vegetation was observed in Wetlands 1, 2 and G, there was no evidence of contamination; the plants probably died as a result of hydrologic changes. Sedimentation, a strictly physical impact, had occurred in Wetlands 2, 5 and G. Wetlands C, D and F showed no sign of contamination or other impacts associated with the landfill, and it appeared that contamination reached Wetlands 4 and E only occasionally, if at all.

Although all 14 wetlands were evaluated in the assessment conducted for this site, only Wetland 4, a 2-acre wet meadow just south of the landfill, will be examined in detail for this case study.

Field Investigation

Wetland 4 contains no open water and drains via a culvert under the road, which surfaces in a depression in a cow pasture and discharges into Dunstable Brook. It receives landfill runoff, but only after it has passed through and been filtered by Wetlands 2 and 3. No signs of contamination or vegetative stress were observed. Thus, it does not appear to be directly impacted by the landfill. The eastern portion of the meadow, which receives surface water flow from Wetland 2, is vegetated with sensitive fern (*Onoclea sensibilis*), meadowsweet (*Spirea latifolia*), steeplebush (*S. tomentosa*), asters (*Aster spp.*), *Sphagnum* moss and several species of goldenrod (*Solidago spp.*), grass and sedge.

A soil pit revealed Scarboro muck with a 4-in. layer of decomposed black organic matter underlain by about 12 in. of dark greyish-brown, mucky sandy loam. There were lenses of coarse sand and gravel, indicating past deposition during flooding. Below this was an abrupt transition into mottled (containing areas of orange oxidized iron and grey reduced iron) yellowish silt. The soil was quite saturated considering the time of year (October): in 2 to 3 min, 4 or 5 in. of water seeped into the hole and the sides rapidly collapsed.

The wetland's long axis is inhabited by grasses and sedges. The western portion of the meadow, into which Wetland 3 flows, consists of hummocks and is very densely vegetated with purple loosestrife (*Lythrum salicaria*), climbing nightshade (*Solanum dulcamara*), and several goldenrod and sedge species. This part of the wetland is considerably wetter underfoot than other sections.

Interpretation of Field Data

Ecosystem Functions

This wetland is ranked high for primary production because it provides abundant food for wildlife, particularly birds. Organic matter is broken down and made available at a moderate rate, so decomposition is ranked medium. However, because flow through the meadow is slow, most nutrients do not leave the area via surface water; thus it is ranked low for nutrient export. On the other hand, nutrients incorporated into plant materials are available to herbi-

vores and cycle through terrestrial and aquatic food webs. Because much of the food produced here is consumed by mobile species (birds), nutrient transfer is high. Overall, Wetland 4 is ranked dium for ecosystem functions, primarily because it does not ort nutrients or support aquatic organisms.

Wildlife Habitat Functions

This area is a wet meadow, unlike nearby wetlands. While only the shrub and herb/emergent strata are occupied, they are quite dense. A wide variety of plants provides food, cover and reproductive resources for a similarly wide variety of animals. "Edge," the transition between vegetative communities (in this case, from forest to wet meadow) is an especially valuable zone to wildlife. This zone is quite diverse and provides abundant food and cover.

Soil characteristics (i.e., mottling) show that the meadow exhibits another transitional phase, a seasonal fluctuation between saturated and unsaturated conditions, so it provides additional habitat for species that require wet conditions for only part of the year. The plant community produces a variety of seeds, fruits and browse and can support a reasonably-sized consumer population, which will in turn support predators. Wetland 4 receives high rankings for density and number of vegetative strata, floral diversity, "edge" and food production, and overall wildlife habitat functions.

Hydrologic Functions

Wetland 4 is primarily a discharge area where groundwater moves upward and/or laterally into surface water. It receives precipitation, surface water and groundwater flow from the landfill and vicinity. Because it is relatively wide and has a constriction at its outlet, it has moderate to high capacity for flood storage and retardation. There is no open water associated with this wetland, thus it has no value for shoreline protection. Its overall ranking for overall hydrologic functions is low-to-moderate.

Water Quality Functions

There are no clear channels here and the vegetation is dense, thus the velocity of surface water is reduced when it enters Wetland 4. Because water's ability to carry sediment decreases with velocity, this area acts as an effective sediment trap. The meadow receives full sun for most of the day, providing ample opportunity for photosynthesis. Thus, its plant community is capable of high oxygen production.

The vegetation and microorganisms, through their metabolic processes, also effectively remove and store nutrients such as nitrogen and phosphorus, which reduces the possibility of algal blooms, excess macrophyton production, and associated eutrophic processes in receiving waters. Removal of particulates and nutrients also reduces biochemical oxygen demand (BOD) and downstream pollution. However, much of the water Wetland 4 receives is probably "pre-filtered" by Wetlands 2 and 3, so its ranking is reduced to medium. Although it has a high capacity for water quality improvement, its relatively small size reduces its overall ranking to medium-to-high.

Socioeconomic Functions

Wetland 4 is somewhat secluded and surrounded by forest. It contains a number of flowering species and attracts a variety of animals, so it is ranked high for aesthetic value. Because of its habitat value (particularly "edge") and proximity to several other habitat types (forest, pasture), this wetland makes an excellent area for birding and other wildlife observation but is not of interest for most other recreational activities and so receives a medium ranking for this function.

Although the meadow is not a unique ecosystem, it is easily accessible and may be of some value for ecological study. No historic or economic values are known for the area. Overall, it is nked medium for socioeconomic values.

Evaluation of Current Impact

The meadow does not appear to have been impacted by disposal activities or contamination associated with the landfill. As discussed above, runoff from the landfill must pass through Wetland 2 or Wetland 3 before it reaches Wetland 4. Apparently, these wetlands have adequate filtration, flood storage and sediment-trapping capacity to protect the meadow, as no signs of contamination or stress were observed. These two wetlands may also serve to filter groundwater before it enters Wetland 4.

Evaluation of Remedial Alternatives

The U.S. EPA selected a source control remedial alternative consisting of a full synthetic membrane cap with leachate collection, gas collection and venting, surface water collection and diversion, and regrading as needed to stabilize slopes. The selected remedy would control runoff and erosion and was predicted to reduce leachate production by 99%.

As originally planned, installation of the perimeter drain and associated regrading would have obliterated Wetlands 1 and G through filling and drainage. The plans also called for portions of Wetlands 2, 3 and B to be dredged for drainage purposes. In addition, most of Wetlands 3 and 4 would have been altered either by channelization or by installation of a sedimentation basin. Channelization would also have reduced Wetland 4's ecosystem, wildlife habitat, pollution attenuation and hydrologic functions.

Based on evaluations of wetland functional values and the recommended remedial alternative, measures were developed to avoid impacts, minimize unavoidable impacts or compensate for lost wetlands. It was recommended that relocation of the sedimentation basin be considered in order to avoid direct impacts to Wetlands 3 and 4.

Because relocation of the perimeter drain was not feasible, expansion of Wetland 2 and creation of additional wetlands was proposed. The sedimentation basin was considered a likely candidate for replication once the landfill cap had been stabilized with vegetation. (Replication, the creation of a wetland similar to one that has been destroyed, would have consisted of dredging the sedimentation basin to a depth sufficient to support wetland vegetation and planting emergent species such as cattails.) Also recommended was the use of existing wetlands for storm water retention. Erosion and sedimentation controls were suggested to augment those already planned for the construction process.

Finally, the assessment proposed a monitoring program designed to observe changes in wetland ecosystems and leachate generation. This monitoring is critical not only to evaluate the changes in altered wetlands and the success of replication efforts at the site, but also to gather data that can be applied to other sites where wetland restoration, alteration or replication is proposed.

The information and proposed mitigative measures presented in the wetland assessment enabled the U.S. EPA to develop its recommendations for design changes to the selected remedy, including relocation of the sedimentation basin.

CONCLUSION

This wetland assessment procedure examines ecosystem, wildlife habitat, hydrologic, water quality and socioeconomic functions. Unlike other similar procedures, it also determines current impacts and evaluates the impacts of proposed remedial actions. Based on this information, the U.S. EPA can modify proposed remedial actions in order to avoid or minimize adverse impacts. In situations where impacts have already occurred or are unavoidable, appropriate mitigative measures, such as wetland replication or restoration, can be developed.

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CERCLA Environmental Issues and Requirements

EIB/ERRD Coordination Procedure

I. Applicability

This procedure is intended to establish general guidelines for coordination between the Emergency and Remedial Response Division (ERRD) and the Environmental Impacts Branch (EIB) on environmental issues relating to CERCLA remedial actions. Removal activities are not a subject of these procedures.

Moreover, the purpose of this coordination will be to determine some of the federal environmental requirements applicable to particular CERCLA projects. These requirements can be specifically mandated, such as those contained in the National Historic Preservation Act, Coastal Zone Management Act, Wild and Scenic Rivers Act, Endangered Species Act, and Executive Orders on Wetlands and Floodplains; or they can be generic requirements under the National Environmental Policy Act, relating to hydrology, geology, noise, biology, socioeconomics, land use, and energy.

Specific federal environmental standards or criteria such as those relating to water quality, air quality, drinking water, and permissible chemical exposure levels will not be a subject of this coordination. Information on environmental standards should be obtained by the CERCLA project officer from the appropriate program area within EPA or an appropriate federal agency.

II. Early Scoping of Environmental Issues

Fund - Financed Remedial Actions

EPA project managers will provide EIB with a copy of the clearinghouse letter to the State Agency designated as intergovernmental liaison pursuant to Executive Order 12372. This letter contains general project information, including site location, description and history; therefore, it should provide an adequate basis for a preliminary determination of potential environmental concerns. For State-lead projects, a copy of this letter should be secured for EIB through the project manager's counterpart in the State. Turnaround time for review and comments: 30 days.

Responsible Party Remedial Actions

EPA project managers will provide EIB with a copy of the Administrative Order issued to the potentially responsible party(s) for a particular remedial action. The Order will normally contain enough detailed information on site characteristics for EIB to make a preliminary determination of potential environmental concerns. Turnaround time for review and comments: 30 days.

The purpose of early scoping of environmental issues is to provide EIB with sufficient information in order to identify potential conflicts with federal environmental regulatory requirements (as outlined under "Applicability") and potential negative impacts to the environment as a result of the remedial process, whether it is carried out by contractors to EPA, a State, or a potentially responsible party. Identification of these issues in the above manner will allow time for appropriate adjustments in the final project workplan (An EIB contact should be designated to whom the above materials can be sent.)

III. Coordination During Remedial Investigation

CERCLA project managers will coordinate with EIB on an as-needed basis during the performance of the remedial investigation on significant environmental issues identified during the scoping process. Also, project managers will alert EIB to any new developments which may have adverse environmental consequences in order to properly assess the development and take whatever action that the project manager, in consultation with EIB, believes is appropriate.

The purpose of this coordination during the remedial investigation is to ensure that any data-gathering needs relating to significant environmental issues are properly attended to.

IV. Coordination During Feasibility Study

CERCLA project managers will coordinate with EIB on an as-needed basis during the initial screening of alternatives, followed by the detailed analysis of alternatives conducted in the feasibility study. Coordination should usually focus on environmental issues that have surfaced during earlier project stages. The project manager may request EIB participation in the review of the environmental assessment performed during the detailed analysis of alternatives if he feels that there are environmental issues involved e.g. floodplains or wetlands assessments, which require the benefit of EIB's experience and expertise.

The purpose of this coordination during the feasibility study is to ensure that the project manager properly assesses the environmental impacts of remedial alternatives, develops appropriate mitigation measures to offset environmental impacts associated with the selected alternative, and fulfills federal environmental regulatory requirements specific to the project.

References: Coordination between Regional Superfund and OFA Regional Counterparts on CERCLA Actions (Memo from Hedeman/Hirsch dated 10/29/84); Applicability of Section 102(2)(c) of NEPA to Response Actions Under Section 104 of CERCLA (Memo from OGC to Lavelle dated 9/1/82); Appendix to revised National Contigency Plan (Memo from L. Thomas to R.A.s); Draft Guidance Document for Feasibilility Studies Under CERCLA; Implementation of Procedures on the National Environmental Policy Act (11/6/79 regulations).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

DATE: _____

Subject: **Notification of Federal Natural Resource Trustees**

Site _____ City _____
County _____ ; State,Cw,Terr _____
Operable Unit Name _____

TO: DOI - Regional Environmental Officer *(by location, check ☐)*

☐ Anita Miller, Mid-Atlantic Region *(NJ)* (FTS-597-5378)
200 Chestnut Street, Room 502
Philadelphia, Pa 19106

or

☐ Bill Patterson, Northeast Region *(NY)* (FTS-835-6856)
Boston Federal Office Building
10 Causeway Street Room 1022
Boston, Mass. 02222

or

☐ Jim Lee, Southeast Region *(P R, V I)* (FTS-242-4524)
Pussel Federal Building, Suite 1320
75 Spring Street S.W.
Atlanta, Georgia 30303

and

DOC - NOAA Coastal Resource Coordinator
Thor Cutler, EPA Region 2 (FTS-264-6325)
26 Federal Plaza, Room 734
New York City, New York 10278

FROM: Project Manager: _____ Phone: _____
Chief: _____ Section: _____ Phone: _____

1) In accordance with Superfund Amendments and Reauthorization Act of 1986, §104 (bX2) and §122(j), the EPA provides notification of the following: *(check one ☐)*

☐ Potential damages to natural resources may result from releases under investigation at the subject site, as determined from ongoing assessments or investigations. (§104(bX2) SARA)

☐ You are encouraged to participate in the upcoming negotiations as you deem appropriate. EPA intends to initiate negotiations with potentially responsible parties about the subject site, such that they may conduct or finance a _____ at the site.(§122(j) SARA) *(remedial process)*

☐ A request for preliminary decisions on a covenant not to sue for natural resources, or an all claims release.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278

2) STAGE OF ACTION: ☐ draft or ☐ final

☐ Preliminary assessment/ ☐ site investigation or ☐ ESI (extended site investigation)
☐ Immediate Removal ☐ Expedited Response Action
☐ Work Plan
☐ Remedial Investigation
☐ Endangerment Assessment
☐ Feasibility Study
☐ ROD
☐ RD
☐ RA

ACTION REQUESTED OF TRUSTEE: _____

SEPARATE OPERABLE UNITS? *(name + description)* _____

3) RESPONSE CATEGORY ☐ fund ☐ enforcement PRP _____

LEAD: ☐ Federal ☐ State ☐ Fed Facility

4) ☐ DOCUMENTS ATTACHED: (**three copies to DOI, three copies to DOC**) List names of documents:

5) If the following information is not contained in the attached documents, please provide

LOCATION: USGS quad map w/location of site and directions to site (quad name) _____

SITE EXPOSURE POTENTIAL: (copy exec. summary, EPIC, or relevant doc.)

CHEMICAL HAZARDS and history of releases: (copy appropriate tables, lists)

Natural Resource Damage Assessments Regulations
Department of the Interior

The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) provides for the recovery of damages for injuries to natural resources resulting from a discharge of oil or a release of a hazardous substance. Section 107(f)(2)(C) states that any determination or assessment of damages made by a Federal or State trustee in accordance with regulations promulgated under Section 301(c) shall have the force of and effect of a rebuttable presumption of correctness on behalf of the trustee in any administrative proceeding under CERCLA or Section 311 of the Clean Water Act. Thus, pursuant to Section 301(c), and Executive Order 12316, the Department of the Interior published final Natural Resource Damage Assessment Regulations on August 1, 1986 (51 FR 27674), and on March 20, 1987 (52 FR 9042). The 1986 regulations included procedures for the overall natural resource damage assessment process and specific procedures for conducting "type B" assessments in individual cases. The 1987 regulations contained simplified procedures for conducting "type A" assessments in coastal and marine environments. These regulations have been codified at 43 C.F.R. Part II.

The regulations are for the use of authorized Federal and State officials referred to in CERCLA as trustees for natural resources. These procedures can be used in court actions or administrative proceedings when seeking compensation from the responsible party for injuries to natural resources for which the trustee has responsibility. Natural resource damage assessments are not the same as response or remedial actions. Moreover, assessments are not intended to replace response actions but are intended to supplement them by providing a process for determining proper compensation to the public for injury to natural resources. When injuries occur to natural resources, trustees may seek damages for those injuries from the responsible party, including the reasonable costs of conducting the assessment. Natural resource damages cannot be collected for an incidence or site for which no responsible party can be identified (i.e., where Superfund will totally pay for cleanup).

The regulations provide guidance for choosing between a type A and a type B assessment. The type B procedures are relatively general, and they provide the flexibility needed to meet the diversity of resources, ecosystems, and oils and hazardous substances likely to be encountered, as well as allowing the use of evolving scientific and economic methodologies. They do not provide specific procedures for selecting and implementing assessment methodologies, although they do provide objectives and criteria. The type B regulations also provide specific definitions of natural resource injuries and describe acceptable assessment methodologies. The type A procedures use a

computer model referred to as the "Natural Resources Damage Assessment Model for Coastal and Marine Environments" Specific data inputs, such as location, volume of spill, tides, winds, etc., are required to run the Model. In this Model, natural resource injury is determined through the interaction of the physical fates and biological effects submodels. Damages are determined through the use of an economic damages submodel.

The regulations provide a planned approach to natural resource damage assessment and allow active involvement of both the public and potentially responsible parties in the process. The procedural steps to be taken in an assessment (type A and type B) are shown in Attachment 1. The various phases and steps in an assessment are described briefly below.

A. Preassessment Phase

1. Apply criteria in regulations to determine whether there is a reasonable probability of making a successful claim before funds and efforts are expended in carrying out an assessment. This is called a Preassessment Screen and must be documented in a report.

B. Assessment Phase

1. Cooperate with other agencies.
2. Notify responsible party of intent to perform an assessment.
3. Prepare Assessment Plan.
4. Allow for public comment.
5. Conduct the plan.

    a. Determine whether an injury has occurred.
    b. Quantify the injury.
    c. Determine damages (lesser of restoration costs or loss of use/value).

C. Post Assessment Phase

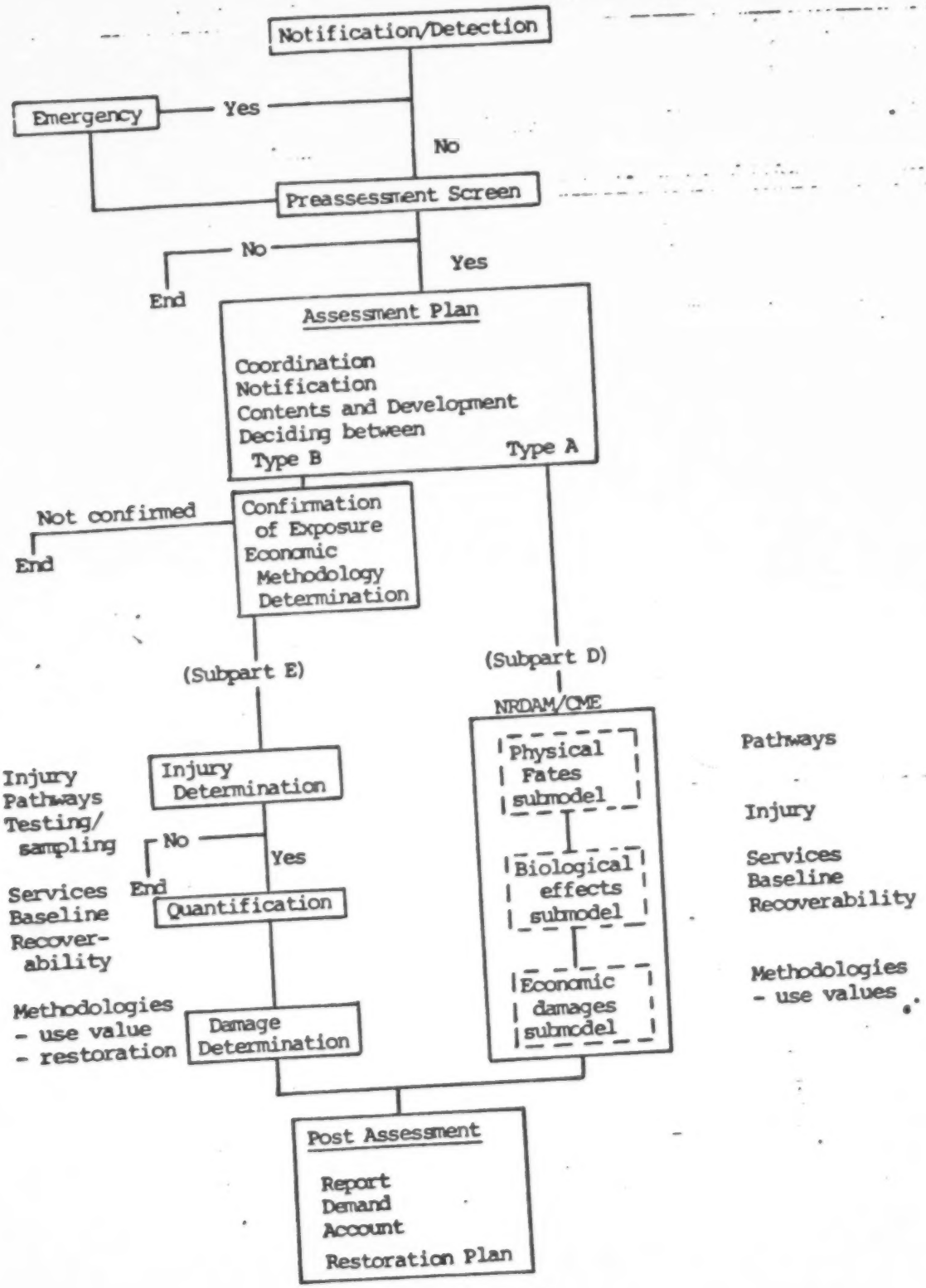
1. Prepare Assessment Report.
2. Present report with demand for payment to responsible party.
3. Settle or sue.
4. Prepare a Restoration Plan.
5. Implement the plan.

Certain changes in the final regulations are necessitated by the Superfund Amendments and Reauthorization Act of 1986. Consequently, the Department recently issued a proposed rule on April 17, 1987, to modify the final regulations to conform with these changes (52 FR 12886).

Attachment

Prepared by: Dr. James D. Brown
FWS, Atlanta, Georgia
October 7, 1987

NATURAL RESOURCE DAMAGE ASSESSMENT PROCESS



GUIDELINES AND RECOMMENDATIONS FOR USING BIOASSESSMENT IN THE SUPERFUND REMEDIAL PROCESS

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December 23, 1987

II. THE ROLE OF BIOASSESSMENT IN THE REMEDIAL PROCESS

The selection of the appropriate bioassessment procedure(s) is dependent on the objectives of the particular stage in the remedial process. The amount of information required to make necessary decisions regarding further activities at the site tends to increase as the overall assessment of a site proceeds from the preliminary screening to the endangerment assessment and selection of remedial action. Regardless of the stage in the remedial process, it is of primary importance to clearly establish the intended application of bioassessment data prior to such data collection, including the specific questions that are being addressed, the proposed decision criteria and appropriate sampling strategy and statistical design. If properly planned, data collected at each stage can be used to guide the development of work plans for subsequent stages. The early incorporation of an overall sampling design that adequately addresses the potential risks to natural resources reduces the possibility that additional sampling will be required later that might delay or hinder the remedial process. The role of bioassessment approaches during the different stages of a site remediation is discussed in more detail below.

Preliminary Assessment: Bioassessment as a tool in site screening

The data needs for the preliminary assessment are usually directed toward broad-scale screening for the presence or absence of toxicity. Bioassessment procedures, particularly bioassays, can play an important role in site screening. Combined with information on the site history, visual observations of site characteristics and chemical analyses, bioassays can provide qualitative information on the distribution of toxic substances and the relative toxicity of the site. Bioassays can also provide an indication of the relationship between toxicity and chemical concentrations which may be particularly useful in defining areas where contamination is of concern. For this purpose, the use of two bioassays is recommended. As resources permit, additional acute bioassays could be employed to broaden the range of toxic substances which can be detected. This is especially important at sites with complex mixtures of contaminants or where the site history indicates the possible presence of substances not normally analyzed (e.g., pharmaceutical or dye manufacturing). At sites where the presence of substances known to be especially toxic to a specific organism or type of organism is suspected, additional bioassays for those substances should be included. For example, since fish are particularly sensitive to the pesticides endosulfan, rotenone and toxaphene, inclusion of an appropriate laboratory fish bioassay would be recommended if the presence of one or more of these substance was suspected.

Remedial Investigation: Bioassessment as a tool in characterization of the extent of contamination

Chemical information obtained during the preliminary assessment can be used to help guide the site characterization during the remedial investigation phase of the study. The chemical analyses should provide information on the types of substances present and the possible ranges of their concentrations. Using basic information available for compounds on the hazardous substance list regarding their toxicity to different organisms, the chemical information can indicate which bioassessment approaches may be most fruitful. At sites where only one or a few closely related substances of concern are predominant, it may be possible to select a bioassessment technique known to be sensitive to those substances. This is important in situations where it is necessary to limit the number of different tests run on each sample in order to increase the total number of samples that can be tested. For example, acute Crustacea bioassays may alone be an adequate bioassessment option in situations where trace metals are the primary concern, since Crustacea used in common bioassays are reasonably sensitive to toxicity from most metals. This would allow an increase in the spatial or temporal coverage of sampling while maintaining confidence that the toxic substances present were being detected. Where chemical information during the

preliminary assessment indicates the presence of a complex mixture of contaminants, two or more different bioassays should be run on each sample to increase the likelihood that toxicity from the different toxic materials would be identified.

During the remedial investigation phase, bioassessment procedures provide a direct evaluation of the spatial distribution of toxic areas and an indication of the degree to which toxicity is associated with the distribution of one or more toxic substances. In the simplest case, the bioassessment acts as an adjunct to the chemical analyses. The chemical measurements provide the link between the spatial areas and the source(s) of contamination, while the bioassessment measurements determine the zones where the chemical contamination is sufficient to be toxic. In other situations, toxicity detected in the bioassessment may not vary spatially in the same manner as the majority of the chemicals measured because the biological test is responding to substances that are not detected in the standard chemical tests. In both cases, synoptic surveys of bioassessment and chemical measurements should be made. (Note that the spatial heterogeneity at hazardous waste sites is often very high, both horizontally and vertically. As a result, the bioassessment and chemical samples must, if at all possible, be taken as aliquots from the same, homogenized sample.)

Bioassays have been used effectively to determine the extent of contamination at the Rocky Mountain Arsenal waste site in Colorado (Thomas et al. 1986). Using the results from a lettuce seed soil bioassay and a statistical mapping technique called kriging, the extent of contamination at the site was determined solely by mapping the levels of toxicity.

In summary, the selection of the numbers of samples and the types of tests to perform must be considered on a case-by-case basis, weighing the trade-off between collecting greater numbers of samples to improve spatial coverage and conducting more tests at each station to broaden the types of toxicity that will be detected. In general, a minimum of two bioassays should be performed. Additional bioassay tests should be included if the available data indicate the possible presence of organism-specific toxins or complex suites of substances. As resources allow, in situ bioassessments (e.g., benthic community assessments, incidence of disease, bioaccumulation) may be included in the site characterization. Although these types of tests tend to be less precise in their ability to define the spatial extent of problem areas, they are important in demonstrating impact to natural resources and supporting the results of the bioassays.

Feasibility Study: Bioassessment as a tool in establishing site cleanup target levels.

The ultimate goal of site remedial activities is to eliminate any materials that are toxic from exposure to biological organisms. Bioassessment procedures have obvious uses in meeting that goal by providing site-specific information on the distribution of toxic areas and the levels of site-related contaminants that are toxic. Bioassessments can be used in two ways to assist in determining target levels for cleanup.

The most frequently applied approach to using bioassessment procedures in establishing cleanup levels involves determining the toxicity of a range of concentrations of the substances that are of concern at a site. The range of concentrations to be tested can be prepared by diluting a single sample of contaminated media from the site in the laboratory with clean media or by collecting a number of samples of contaminated media from different spatial areas that are known to have different chemical concentrations. The samples representing the range of chemical concentrations obtained by either approach is tested using one or more bioassessment techniques to determine which concentrations are toxic, and which are not. The lowest contaminant concentration found to be toxic (induce the designated biological endpoint) is determined to be the target level for cleanup.

consideration whether sufficient individuals are present at the sampling locations to obtain the statistical precision capable of allowing toxic effects to be resolved from natural variability. For example, small streams may have too limited a fish population to make creditable population or disease measurements possible.

The scope of work for impact assessments is dependent on the balance that must be achieved between the resources available and the quantitative precision of the assessment. Both the selection of multiple assessment procedures and the number of samples collected directly affect the costs of the overall assessment. The selection task at most sites is generally simpler than implied above, however, because in most situations: (a) the populations suitable for assessment are in fact limited; (b) the area over which the exposure is expected is also usually limited, particularly with respect to the ranges of many organisms that would be tested; and (c) at least the minimum numbers of samples required to obtain statistically meaningful data can usually be readily determined.

Remedial Design/Remedial Action: Bioassessment as a tool in the evaluation of the success of remedial actions

In the same way that bioassessment procedures can be used to establish and map the toxicity of media associated with a site, they can also be used after remediation to confirm that toxicity has been eliminated. Bioassessment may also be used as a tool for monitoring any ongoing activities that are part of the remedy, such as discharges of treated groundwater. Bioassays are commonly used by EPA and other regulatory agencies in monitoring effluents for National Pollutant Discharge Elimination System (NPDES) permits and for testing dredged sediments for open water disposal.

Where the remedy has involved the treatment or isolation of contaminated soils/sediments, bioassays may be the only useful immediate measure of the success of such remedial activities in those areas where the remedy has resulted in substantial disruption (i.e., from construction or dredging) of the natural system. In any case, the most logical bioassessment procedures to use for determining the "cleanliness" of the site are the ones employed to determine the toxicity of the site prior to cleanup. This should be especially clear in the situations where a particular test was used in the selection of the target cleanup level.

If post-remedy assessments are to be performed on sites where no previous bioassessment has been done, the selection of appropriate procedures can be developed following the guidelines for the determination of the extent of contamination (Preliminary Assessment and Remedial Investigation sections). The level of effort will depend on the resources that are available and the level of confidence in the result that is needed.

III. CHEMICAL PROTOCOLS

Introduction

As noted at the beginning of this document, chemical analyses are a key component of the environmental assessment of a site. Accurate and precise chemical data provide the link between a site and contamination and bioeffects seen in the environment. This section on chemical protocols has been included to provide a brief introduction to the types of chemical analyses that are often performed at hazardous waste sites.